BOSTON PUBLIC LIBRARY
3 9999 10105 367 4

September, 1967

CHARLES A. MAGUIRE AND ASSOCIATES
ENGINEERS

BOSTON - PROVIDENCE - HARTFORD

22

Geologic map p. 49
Topographic map p. 39

M3/B16
PW
67/1

GOVERNMENT DOCUMENTS
DEPARTMENT
BOSTON PUBLIC LIBRARY

CITY OF BOSTON MASSACHUSETTS

BOSTON WATER DISTRIBUTION SYSTEM

WITH RECOMMENDATIONS FOR IMPROVEMENTS

September 1967

CHARLES A. MAGUIRE AND ASSOCIATES
ENGINEERS

BOSTON – PROVIDENCE – HARTFORD

2 Sept. '69

CHARLES A. MAGUIRE & ASSOCIATES
E N G I N E E R S

PARTNERS
HOWARD W. HOLMES
MILTON E. NELSON
HAROLD BATESON
GORDON BRONSON

ASSOCIATES
ERIC REEVES
THOMAS C. MURPHY
ROBERT L. PARE
FRANCIS C. PIERCE
VINCENT M. CANGIANO
EDWARD C. DEAN
K. PETER DEVENIS
CRANSTON R. ROGERS

CONSULTANTS
WENDELL S. BROWN
EDWARD O. GREENE
HENRY J. FITZPATRICK
DR. HENRY M. PAYNTER
PROF. HENRY CAMPBELL
DANIEL T. O'NEIL

ELEVENTH FLOOR - TURKS HEAD BUILDING
PROVIDENCE, RHODE ISLAND 02903
TELEPHONE AREA 401 861-8800

178 TREMONT STREET
BOSTON, MASSACHUSETTS 02111
TELEPHONE AREA 617 542-5150

943 SILAS DEANE HIGHWAY
WETHERSFIELD, CONNECTICUT 06109
TELEPHONE AREA 203 529-8639

REPLY TO: Boston
August 31, 1967
CAM #639.0

Commissioner John F. Flaherty
City of Boston
Public Works Department
511 City Hall Annex
Boston, Massachusetts 02108

Re: City of Boston, Massachusetts
Study of Water Distribution System

Dear Commissioner Flaherty:

In accordance with our contract for engineering services, dated February 10, 1966, we present our report for comprehensive improvements to the water distribution system of the City of Boston, Massachusetts.

The major conclusion reached was that the trunk main distribution system will be adequate for future needs if a comprehensive program for rehabilitation of existing pipes is undertaken. The conclusions and recommendations reached during the study are outlined in the Syllabus to the Report.

We would be very pleased to discuss the contents of this report with you at your convenience.

Respectfully submitted,

CHARLES A. MAGUIRE & ASSOCIATES

Gordon Bronson, Partner

Charles D. D. Howard, Project Manager

COMMONWEALTH OF MASSACHUSETTS
GORDON BRONSON
No. 6372
REGISTERED PROFESSIONAL ENGINEER

GB/CDDH/jt
Enclosure

Digitized by the Internet Archive
in 2024 with funding from
Boston Public Library

https://archive.org/details/bostonwaterdistr00bost

ACKNOWLEDGMENTS

The work described in this report was performed as HUD Project No. P-Mass.-3307. Data was furnished by agencies of the U. S. Government, the Commonwealth of Massachusetts, and the City of Boston.

Edward J. Pinkul, Division Engineer of the Boston Water Division, has made many practical suggestions. The excellent cooperation of City employees throughout the study is gratefully acknowledged.

Field measurements were made by Robert Vitali, Field Engineer, and Charles Knoener, Eastern District Manager of Pitometer Associates. Specialized advice was obtained from Dr. Henry Paynter, Joseph P. Radziul, Dr. Uri Shamir and Dr. Ronald T. McLaughlin. These consultants made major contributions to the development of suitable analytical techniques and the evaluation of results. A preliminary study of corrosion in the Boston water distribution system was made by the Hinchman Company and the Cast Iron Pipe Research Association.

At Maguire Associates, the interest and consideration of K. Peter Devenis, Associate, had a major influence on the course of this study and its successful completion. Douglas A. Haith helped formulate and execute the method of analysis. Assistance with computer programming and the gathering of data was received from David D. Moran and Robert A. Barrows. Peter M. Copland, Senior Draftsman, drew the entire set of plans for this study; his work is responsible for whatever pleasing appearance this report may have.

C. D. D. Howard
Boston, 1967

BOSTON WATER

A Report on the Distribution System with Recommendations for Improvement

TABLE OF CONTENTS

SCOPE OF WORK

SYLLABUS

CONTENTS OF INDIVIDUAL CHAPTERS

WATER SUPPLY AND USE	WSU
THE DISTRIBUTION NETWORKS	DN
SOUTHERN LOW SERVICE	SLS
SOUTHERN HIGH SERVICE	SHS
HIGH PRESSURE FIRE SERVICE	HPFS
PARKER HILL	PH

CONTENTS OF CHAPTER APPENDICES

THE REPORT

Charles A. Maguire & Associates

Boston Hartford Providence

SCOPE OF WORK

The scope of work for the Boston Water Study is spelled out in a contract for engineering services entered into between the City of Boston and Charles A. Maguire & Associates on February 10, 1966. This contract provided for an engineering investigation and report on improvements necessary to the water distribution system including reinforcements and cleaning and lining of existing water mains. The contract specified that all the work including the submission of a detailed comprehensive written report would be completed and submitted to the Commissioner of Public Works on or before September 1, 1967.

It was desired to prepare an overall program for the improvement of the entire City water system. The engineering analysis was intended to bring out deficiencies as they existed and to draw up a systematic program to provide adequate potable water for consumption as well as an adequate supply for fire fighting. The need for this study was indicated by inadequate fire flows and static pressures in various sections of the City and concern over the hydraulic capacity of trunk mains.

The City agreed to supply all existing records, reports, maps, plans or other data which would be required for the study and to obtain other materials as necessary from other agencies. Labor and equipment required to operate appurtenances and to tap exposed mains for hydraulic measurements were supplied by the City. It was further agreed that the City would take all necessary actions and execute all required forms for compensation.

The scope of the work was to encompass all aspects of the water distribution system of the City of Boston. The scope did not include a study of the sources of water or the methods of conveying water to the City. Other items excluded from the work were fire department operations including types and numbers of equipment used and fire fighting procedures; evaluation of the sources and use of revenue within the Water Division, use of men, materials and equipment for normal maintenance and operation of the network and the interaction of the Division with other divisions of the Public Works Department and the City government.

The present scope of work was adequate to determine how the existing water system could be maintained and expanded to provide future services comparable to those of the past. Further studies would be necessary to optimize the role of the Water Division and its interaction with other agencies of the City and the State on technical and economic levels.

SYLLABUS

Water Supply and Use

The City of Boston is supplied by a system of reservoirs, aqueducts and pipes maintained and operated by the Metropolitan District Commission. This system provides adequate quantities of potable water to supply needs for the foreseeable future.

The MDC water is received by the City at 24 major metered inputs. During 1965, the total quantity purchased from the MDC was approximately 43,800 million gallons which was distributed by service levels as follows:

Southern Low Service	41%
Northern Low Service	9%
Southern High Service	47%
Southern Extra High Service	3%

The rate charged by the MDC for this water has risen from $40.00 per million gallons in 1946 to $120.00 per million gallons in 1963. The increase in rates has helped finance major needed improvements in the MDC system.

Consumption in Boston follows definite seasonal, daily and hourly patterns. Maximum consumption rates occur in the winter and summer, Figure WSU4. There is a slight trend underway for spring and fall consumptions to increase and reduce seasonal variations. This may be a characteristic of a water supply system which lacks reserve capacity to deliver peak flows to an area growing in demand and variety of users. Recent improvements to the MDC system should change this trend.

The trend for greater use of water and increasing numbers of daily commuters to Boston (850,000 in 1966 rising to 1,290,000 by the year 2020) has overshadowed the recent decrease in Boston's resident population. Since 1956 the largest hourly consumption recorded (199 MGD) occurred on the peak day (146 MGD) of the 11-year period examined. There has been no trend for the ratio of peak hourly consumption to average annual consumption (1.60) to increase. The past water use and projected future demands are shown on Figure WSU9.

The hourly variation in consumption throughout the City on a day of high demand was obtained by analysis of field data. Typical dimensionless demand curves for various parts of the City are shown on Figure WSU6. The Boston distribution system was studied using this data and it was found that the most critical conditions occurred at 11 AM in the Southern High Service (SHS) and 4 PM in the Southern Low Service (SLS) on the study day (The study day is the day for which the performance of the system was evaluated.)

Exceptional demands are made on the Boston distribution system by major water users, needs for fire fighting and leakage. A sum of the needs of 50 large users represents approximately 10-percent of the average daily consumption. Leakage accounts for an additional 10-percent. Major fires require approximately 10,000 GPM (15 MGD) and because of their rare occurrences represent a small percentage of the total City water use. With future growth leakage will become even more significant if left unchecked and large users will become more numerous. Projected future needs for the City shown on Figures WSU9 reflect the nationally recognized trend for increased per capita consumption and projected population growth.

The Distribution Networks

The distribution system has four independent main networks operated at different pressure levels. The approximate maximum static water levels reached in these networks are:

Southern High Service	260 feet
Southern Low Service	172 feet
Southern Extra High Service	395 feet
Northern Low Service	160 feet

The aerial extent of these service levels is generally determined by ground elevation although some areas have more than one service.

There are no storage facilities within the Boston distribution system. The MDC maintains nearby reservoirs at Chestnut Hill and Spot Pond. While the system is basically gravity operated, acceptable minimum pressures during periods of high demand can only be maintained by pumping in the MDC system at Chestnut Hill just outside of Boston. The extremely high elevations of the Extra High Service require pumping at all times. Pressures in Boston are largely governed by pressures at the metered connections to the MDC system. There is a high degree of interaction between the two systems and major changes in either have correspondingly large effects upon the other.

Most pipes in both the MDC and the Boston systems were installed many years ago and internal corrosion has caused a major deterioration in their capacity to convey water. Field data shows that many trunk mains in Boston have Hazen-Williams coefficients of 75 or less. The coefficients for trunk mains are shown on subsequent figures illustrating the system's performance under various demands. Field data for smaller pipes showed a similar range of Hazen-Williams coefficients. The elimination of red water conditions and low hydrant discharges can only be achieved by rehabilitating each small pipe contributing to the undesirable conditions. A program for rehabilitation of smaller pipes is equally as important as a program for restoring the lost capacity of trunk mains and is considerably more expensive. Field experimentation is recommended to determine if a viable alternative to cleaning and cement-lining by conventional methods can be developed. A preliminary study showed that a combination of cleaning without cement-lining followed by water treatment to control corrosion may provide an economical alternative (Boston water is among the most corrosive of waters supplied to major cities of the United States).

All in situ pipe in Boston is either cast iron or steel. Suitably reinforced concrete or cement-asbestos pipe may be used where economically justifiable.

Exterior corrosion of metallic pipe in Boston has not been excessive (in general) because of relatively inert soils with high electrical resistivity. There is little doubt, however, that many pipe failures are basically caused by corrosion but precipitated by unusual loading conditions. In order to completely determine the role of corrosion it is recommended that field tests be made at the time trunk mains are taken out of service for rehabilitation. Pressure tests to pressures slightly greater than normal maximums can be used to estimate pipe leakage prior to cleaning and lining, to determine the tightness of valves and to insure that the pipe is not corroded to the extent that small increases in pressure will cause significant damage. After pressure testing the main should be cleaned, de-watered and inspected internally by a qualified corrosion engineer. If the interior of the pipe appears to be badly corroded, it would be desirable to inspect the exterior at additional locations where electrical measurements suggest active corrosion is taking place. It may be practical to use grouted steel liners of slightly smaller diameter to reinforce badly corroded trunk mains in crowded locations.

The time of travel of a pressure surge across the Boston SLS and SHS distribution systems is approximately 20 seconds. This means that valve closures or main breaks made in intervals shorter than 20 seconds will give rise to a maximum pressure surge of approximately 50 psi for each 1-foot per second velocity change made in this interval. Fortunately

the natural damping characteristics of the networks are good and the gear operated gate valves have slow closure times. If automatic equipment is installed in the system in the future, the danger of high transient pressure waves should not be overlooked. The new existing automatically-operated butterfly valve in the MDC Low Service pumping station at Chestnut Hill is a potential source of surges in the Boston SLS and should be set to operate very slowly.

While the most important part of the Boston distribution system is supplied by the SLS and the SHS some consideration was given to possible problems in Charlestown, East Boston and in areas served by the EHS. In East Boston the existing pipes when rehabilitated will be adequate for future demands. In the EHS, in areas of high elevation the distribution system should receive early attention for rehabilitation as part of a comprehensive plan for cleaning and cement-lining or as an experimental area to test alternative methods for rehabilitation.

In Charlestown, improvements planned by the BRA will improve the existing highly interconnected grid of smaller pipes. A new 36-inch trunk main should be constructed in conjunction with the new highway I-695 to connect Andrew Square and City Square. This addition will cost approximately $900,000 and will facilitate cleaning and cement-lining of the trunk mains in Charlestown. In addition it will provide needed reserve capacity and flexibility to the distribution system in Boston Proper and South Boston.

The Southern Low Service

A considerable pressure variation occurs during the day in the Southern Low Service (SLS) because of high hydraulic losses in both the SLS and the MDC system. The maximum variation, approximately 45 feet at 2 PM, occurs at places which are most distant from the MDC inputs, e.g. near Columbia Point in South Boston. Extensive improvements to the MDC and Boston systems will reduce this variation to approximately 20 feet.

The unimproved SLS would be totally inadequate to supply the anticipated demands for the year 2020. However, if all major trunk mains are cleaned and lined to restore their hydraulic capacity the SLS would function better with the 2020 demands than it does at present. If pipes found to be structurally unsound are suitably rehabilitated or replaced and the proposed new Charlestown trunk main added to the existing system, the SLS would have sufficient capacity and flexibility to meet projected demands and unforeseen emergencies.

The program for rehabilitation was studied with the aid of extensive computer analysis. It was found that in South Boston there are a number of trunk mains which are capable of carrying much more water than presently required. Effective utilization of these mains will allow rehabilitation of most of the SLS trunk grid without limiting the network's capacity to carry emergency flows, without causing low pressures and without causing numerous dirty water problems due to flow reversals in other unlined trunk mains. Exceptions occur in Roxbury and in North Dorchester where consumers should be served by the Southern High Service during cleaning and lining operations along Dudley Street and Adams Street. The connection with the SHS in Adams Street should be retained for the future and made permanent through a 20-inch pressure reducing valve.

The capacity of the SLS trunk grid to deliver fire flows is excellent. In South Boston large volumes of water are available at relatively low pressures and require mobile pumpers for effective utilization. This will continue to be the case in the future. For full effectiveness, the grid of smaller mains in this area must be rehabilitated. In Boston Proper the High Pressure Fire Service pumping stations can receive ample volumes of water from the SLS.

The Southern High Service

Like the Southern Low Service (SLS), the Southern High Service (SHS) requires major rehabilitation before it will be adequate to meet future demands. The most interesting possibility for future use of the SHS is its use for fire fighting. The rehabilitated network will provide greatly improved pressures for effective fire fighting in many areas, including the Central Business District. It is recommended that fire fighting equipment and procedures be examined with this improvement in mind.

Improvements to the MDC system will have major effects on the SHS. In order to fully utilize these improvements it is recommended that existing venturi meters be enlarged and a new 36-inch diameter pipe be constructed between the new MDC shaft near Morton Street and the existing 36-inch SHS pipe in Ruthven Street (cost approximately $900,000).

The improvement program suggested in subsequent pages will result in major disturbances to sediment in many parts of the present system. This undesirable result is necessary to avoid endangering the network's capacity to deliver emergency discharges during cleaning and lining of major pipes.

The High Pressure Fire Service

The High Pressure Fire Service (HPFS) consists of two pumping stations and approximately nineteen miles of unlined cast iron pipe. The HPFS is presently exclusively used to fight fires in the congested high value district of Boston Proper. At the present time this separate system takes suction from the Southern Low Service (SLS) and provides a maximun discharge of approximately 18,000 gpm at pressures up to 200 psi.

The existing rotating machinery appears to be in good condition although the stations would have to be temporily put out of service for a complete inspection by a factory mechanic to determine remaining useful life. The pumps would provide better fire fighting capabilities if they had flatter characteristics and the future integrity of the aging piping system would be protected by a lower shut-off head. Past operating experience has led to an operating rule restricting maximum pressures to 200 psi (the system was designed in 1921 for 300 psi) to avoid causing major leaks.

The steam supply to the Kneeland Street pumping station is adequate and will be available for the foreseeable future. At the Atlantic Avenue pumping station the DC switchgear is in poor condition and requires major maintenance or replacement. If replacement is indicated the station should be converted to AC or steam as DC power may not be available indefinitely.

The existing apparatus for signalling the pumping stations to request start-up or pressure variation is entirely obsolete and in poor condition. This signal system should be modernized and incorporated into the Fire Department's regular communications network.

Discussion with officials of the Fire Department suggests that the high pressures generated by the pumping station are primarily intended to facilitate use of deck guns mounted on mobile equipment that does not contain its own booster pumps.

The rehabilitated SHS will provide adequate pressure and discharges for hand held hoses and could effectively incorporate the existing HPFS piping network. Consideration should be given to a re-evaluation of fire fighting equipment and techniques in the HPFS area. It is recommended that the City engage special consultants for such further studies.

The Parker Hill Area

Parker Hill in West Roxbury has a summit elevation of approximately 220 feet and is supplied with water by the Southern High Service (maximum static water level of 270 feet). Near the summit low pressures are experienced and the need for a detailed study of this relatively small area was indicated.

High hydraulic losses in the 48-inch MDC main leading to Parker Hill were found to result in pressures as low as 8 or 10 psi near the summit during periods of high demand in the City.

Concern for fire protection near the summit prompted a detailed analysis of hydraulic considerations on Parker Hill. It was found that the trunk mains leading to the site of an abandoned reservoir at the summit provide capacity for large emergency hydrant discharges. The Fire Department is aware of the low pressure conditions and uses hard suction lines on pumpers in the area. The hydrant spacing is excellent and large volumes of water are available from mobile pumpers for fire fighting.

While the area has an adequate water supply for fire fighting it should not be inferred that pressures are adequate for normal water use. It is recommended that all new construction with upper floors above elevation 180 feet be supplied with self-contained pumping units to boost pressures for domestic use. Buildings at lower elevations having automatic sprinklers or special requirements for higher pressures will also require booster pumps.

For the rehabilitation of the SHS trunk grid it is necessary to clean and line the larger diameter pipes on Parker Hill and to complete their circuit around Fisher Avenue with a 20-inch main. These improvements are necessary to allow rehabilitation of the nearby 40-inch SHS pipe in Huntington Avenue.

Cost of Improvements

The following summary of estimated construction costs for improvements to the Boston water trunk main system is presented in order of importance:

Recommended Order of Improvement

No.	Location	Type	Cost
1.	36-inch SHS Main to Ruthven St.	New Construction	$900,000
2.	36-inch Charlestown Connector to Boston Proper	New Construction	900,000
* 3.	Southern Low Service	Cleaning & Lining	1,900,000
* 4.	Southern High Service	Cleaning & Lining	2,560,000
** 5.	Replacing or Maintaining Defective Valves		1,800,000
6.	Charlestown	Cleaning & Lining	200,000
7.	East Boston	Cleaning & Lining	100,000
8.	Completion of Parker Hill Grid (20-inch Pipe)	New Construction	110,000
9.	Extra High Service	Cleaning & Lining	50,000
10.	Replacement of Corroded Pipe (estimated)		1,500,000
11.	Enlargement of MDC Venturi Meters		150,000
	Trunk Mains, Total		$10,170,000

* Rehabilitation of SLS and SHS may be carried on concurrently, but the sequence of improvements as recommended in this report should be followed.

** To be done in conjunction with the cleaning and lining program.

Additional large costs will be involved in the rehabilitation of the smaller distribution pipes throughout Boston. Extra High Service should be used as a test area to evaluate the effectiveness of alternatives to cleaning and cement-lining to restore hydraulic capacity. This test area will require installation of permanent recording equipment and water treatment facilities. The estimated cost for the field experiment for the first 5 years is broken down as follows:

Water treatment equipment and chemicals	$ 40,000
Purchase and installation of recording pressure and flow meters	20,000
Special Buildings	60,000
Salaries of technical staff	100,000
Installation of special valves	50,000
Reports	20,000
Computer Time	10,000
Other	30,000
Total Experimental Cost	$330,000

The program for cleaning and lining smaller mains in South Boston and other areas where hydrant discharges are poor or red water conditions are common should not be delayed until experimental results are available from the EHS test site. During the first 5-years of field experiments, cleaning and lining of smaller mains will require an additional sum. The extent of this work would depend on the rehabilitation program for the trunk mains, the initial results for the recommended EHS test area and the number of small mains that are badly corroded and require replacement.

The estimated cost for smaller mains for the first 5 years is estimated as follows:

Cleaning and Lining	$2,000,000
Replacement and New Construction	500,000
Small Mains, Total	$2,500,000

The total cost for rehabilitating the smaller mains will depend on the results of the experimental program. Since the cost to clean and cement line all the smaller distribution pipes throughout Boston is estimated at 50 million dollars, substantial savings can be realized from a successful experimental program.

Based on the above, the expected total cost of improvements to the trunk main systems and the cost of field experimentation and cleaning and lining of smaller mains during the first five years of the long range program is approximately $15,600,000.00 in terms of September, 1967 prices.

COST SUMMARY

Trunk Mains	$10,170,000
Extra High Service Experimental Program	330,000
Smaller Mains	2,500,000
Construction Cost =	$13,000,000

Contingencies, Engineering, and Miscellaneous Program Costs (20%) $2,600.000

Total Program Cost	$15,600,000

CHAPTER WSU

Water Supply and Use

TABLE OF CONTENTS

	Page
Sources of Supply	3
Water Use in Boston	4
1. Gross Characteristics of Water Use	4
2. Seasonal Variation of Consumption	4
3. Hourly Variation of Consumption	4
4. Exceptional Demands	5
5. Forecasting Future Needs	6

Figures	Figure Number	
Water Supply - Metropolitan Boston	WSU1	9
MDC - Water Consumption and Population Growth	WSU2	11
Past Population Trends - City of Boston	WSU3	12
Seasonal Variation of Consumption	WSU4	13
Hourly Variation of Consumption	WSU5	14
Dimensionless Demand Curve	WSU6	15
Locations of Major Fires 1964-1966	WSU7	16
Population Densities	WSU8	17
Per Capita Consumption, Population Average Daily Consumption	WSU9	18
Hourly Variation of Consumption; Year 2020	WSU10	19

Tables	Table Number	
Total Water Consumption in Boston	WSU1	20
Maximum Consumption in Boston	WSU2	21
Weekly Serial Regression Coefficients, SLS	WSU3	22
Computer Nodes & Consumptions, Southern Low Service	WSU4	23
Computer Nodes & Consumptions, Southern High Service	WSU5	24
Daily Commuters to Boston	WSU6	25
Estimated Future Population and Water Consumption	WSU7	26

CHAPTER DN

The Distribution Networks

TABLE OF CONTENTS

	Page
Conclusions and Recommendations	28
Introduction	31
Hydraulic Evaluation of Pipes	32
Alternatives to Cement Lining	32
Pipe Materials	33
Exterior Corrosion	34
Pressure Surges	35
Charlestown	36
Evaluation and Recommendation	36
East Boston	37
Internal Storage in the Boston System	37
Extra-High Service	38

Figures

	Figure Number	
Topography	DN1	39
Primary Distribution System	DN2	41
Pipe Installation Dates, Gauging Points, SLS	DN3	43
Pipe Installation Dates, Gauging Points, SHS	DN4	45
MDC Venturi Rating Curves	DN5	47
MDC Venturi Rating Curves	DN6	48
Glacial Deposits and Rock Outcrop Locations	DN7	49
Trunk Main Map, SLS, NLS, 1966	DN8	51
Trunk Main Map, SHS, 1966	DN9	53

Tables

	Table Number	
Pipes and Valves in the Distribution System	DN1	55
Pipe Installation Costs	DN2	56
Major MDC Metered Connections	DN3	57

CHAPTER SLS

Southern Low Service

TABLE OF CONTENTS

	Page
Conclusions and Recommendations	60
Introduction	63
Recommended Rehabilitation Sequence	64
1. South Boston	64
2. North Dorchester	65
3. Boston Proper & the MDC Supply Lines	65
Cost of Improvements to the Southern Low Service	65
Changes in Recommended Rehabilitation Sequence	66
Changes in SLS Division Gate Location	66
New Charlestown Trunk Main	67
Fire Fighting Capacity	67

LIST OF FIGURES

	Figure Number	
24 Hour Operation: 1966 Operation	SLS1	71
Total Head Contours: Study Day: 1966	SLS2	73
Pressure Head Contours: Study Day: 1966	SLS3	75
Total Head Contours: Study Day: Year 2020	SLS4	77
Total Head Contours: Improved Network, Year 2020	SLS5	79

TABLES

	Table Number	
Recommended Order of Improvements	SLS71	81

CHAPTER SHS

Southern High Service

TABLE OF CONTENTS

	Page
Conclusions and Recommendations	84
Pressure Variations	88
Network Operation	88
Flow Reversals	89
Trunk Main Pressure	89
Future Operation	89
Trunk Main Fire Flow Capacity	90
Cleaning and Lining Sequence	91
Interaction with MDC Rehabilitation	93
Modifications to Existing MDC Connections	93
Interconnections with the SLS	94
New SHS Trunk Main	94

LIST OF FIGURES

	Figure Number	
24-Hour Operations: Study Day 1966	SHS1	97
Total Head Contours: 11 AM, Study Day	SHS2	99
Total Head Contours: 4 PM, Study Day	SHS3	101
Pressure Head Contours: 11 AM, Study Day	SHS4	103
Total Head Contours: Unimproved Network: Year 2020	SHS5	105
Total Head Contours: Rehabilitated Network: Year 2020	SHS6	107

TABLES

	Table Number	
Recommended Order of Improvements	SHS63	109

CHAPTER HPFS

High Pressure Fire Service

TABLE OF CONTENTS

	Page
Conclusions and Recommendations	112
The Pumping Stations	114
The Kneeland Street Station	114
The Atlantic Avenue Station	115
Hydrants & Valves	116
Utilization	117
Reliability	117
Benefits & Costs of the HPFS	118
The Spectrum of Alternatives	119

LIST OF FIGURES

	Figure Number	
Hydrant Locations	HPFS 1	121
1966 Operation	HPFS 2	123
Piping System Characteristics	HPFS 3	125
Pump Curves	HPFS 4	126
Usage of Steam & DC Power	HPFS 5	127

CHAPTER PH

Parker Hill

TABLE OF CONTENTS

	Page
Conclusions and Recommendations	130
Introduction	131
Physical Characteristics on Parker Hill	131
Water Consumption on Parker Hill	132
Reason for Low Pressure in Parker Hill	133
Anticipated Higher Pressure	133
Significance of Higher Pressure	134
Hydrant Discharge and Grid Operation	135
Field Hydrant Discharge Measurements	135
Results of Computer Analysis	136

LIST OF FIGURES

	Figure Number	
Location at Parker Hill	PH1	140
Topography of Parker Hill	PH2	141
Total Hydrant Discharge = 3760 GPM	PH3	143
Discharge and Head Variation at Parker Hill	PH4	145
Maximum Normal Demand	PH5	147
Hydrant and Pumper Rating Curve	PH6	149

APPENDIX WSU

Water Supply and Use

TABLE OF CONTENTS

Appendices	Appendix Number
Major Water Users	WSU1
Sums	WSU2
Applications of Correlation Studies	WSU3
Synthesis of Water Distribution System Data	WSU4
Pipe Friction Coefficients from Pitometer Gauging Points	WSU5
Procedures for Evaluating Water Consumption Patterns from Field Data	WSU6

APPENDIX DN

The Distribution Networks

TABLE OF CONTENTS

	APPENDIX
WATER DISTRIBUTION SYSTEMS ANALYSIS	DN1
MEMORANDA	DN2
HINCHMAN COMPANY CORROSION REPORT	DN3
CAST IRON PIPE RESEARCH ASSOCIATION REPORT	DN4
PARTIAL BIBLIOGRAPHY	DN5

APPENDIX SLS
SOUTHERN LOW SERVICE

Table of Contents

TABLE NUMBER	TABLE	APPENDIX NUMBER
SLS1	STUDY DAY: 1966: 1AM, 01:00 HOURS	SLS1
SLS2	STUDY DAY: 1966: 2AM, 02:00 HOURS	SLS1
SLS3	STUDY DAY: 1966: 3AM, 03:00 HOURS	SLS1
SLS4	STUDY DAY: 1966: 4AM, 04:00 HOURS	SLS1
SLS5	STUDY DAY: 1966: 5AM, 05:00 HOURS	SLS1
SLS6	STUDY DAY: 1966: 6AM, 06:00 HOURS	SLS1
SLS7	STUDY DAY: 1966: 7AM, 07:00 HOURS	SLS1
SLS8	STUDY DAY: 1966: 8AM, 08:00 HOURS	SLS1
SLS9	STUDY DAY: 1966: 9AM, 09:00 HOURS	SLS1
SLS10	STUDY DAY: 1966: 10AM, 10:00 HOURS	SLS1
SLS11	STUDY DAY: 1966: 11AM, 11:00 HOURS	SLS1
SLS12	STUDY DAY: 1966: 12 NOON 12:00 HOURS	SLS1
SLS13	STUDY DAY: 1966: 1PM, 13:00 HOURS	SLS1
SLS14	STUDY DAY: 1966: 2PM, 14:00 HOURS	SLS1
SLS15	STUDY DAY: 1966: 3PM, 15:00 HOURS	SLS1
SLS16	STUDY DAY: 1966: 4PM, 16:00 HOURS	SLS1
SLS17	STUDY DAY: 1966: 5PM, 17:00 HOURS	SLS1
SLS18	STUDY DAY: 1966: 6PM, 18:00 HOURS	SLS1
SLS19	STUDY DAY: 1966: 7PM, 19:00 HOURS	SLS1
SLS20	STUDY DAY: 1966: 8PM, 20:00 HOURS	SLS1
SLS21	STUDY DAY: 1966: 9PM, 21:00 HOURS	SLS1
SLS22	STUDY DAY: 1966: 10PM, 22:00 HOURS	SLS1
SLS23	STUDY DAY: 1966: 11PM, 23:00 HOURS	SLS1
SLS24	STUDY DAY: 1966: 12AM, 24:00 HOURS	SLS1
SLS25	STUDY DAY: 2020: 2PM, UNIMPROVED NETWORK	SLS2
SLS26	STUDY DAY: 2020: 2PM, IMPROVED NETWORK	SLS2
SLS27	REHABILITATION SEQUENCE: PIPE 40 OUT OF SERVICE	SLS3
SLS28	REHABILITATION SEQUENCE: PIPE 33 OUT OF SERVICE	SLS3
SLS29	REHABILITATION SEQUENCE: PIPE 41 OUT OF SERVICE	SLS3
SLS30	REHABILITATION SEQUENCE: PIPE 32 OUT OF SERVICE	SLS3
SLS31	REHABILITATION SEQUENCE: PIPE 42 OUT OF SERVICE	SLS3
SLS32	REHABILITATION SEQUENCE: PIPE 31 OUT OF SERVICE	SLS3
SLS33	REHABILITATION SEQUENCE: PIPE 76 OUT OF SERVICE	SLS3
SLS34	REHABILITATION SEQUENCE: PIPE 30 OUT OF SERVICE	SLS3
SLS35	REHABILITATION SEQUENCE: PIPE 77 & 78 OUT OF SERVICE	SLS3
SLS36	REHABILITATION SEQUENCE: PIPE 69 OUT OF SERVICE	SLS3
SLS37	REHABILITATION SEQUENCE: PIPE 67 OUT OF SERVICE	SLS3
SLS38	REHABILITATION SEQUENCE: PIPE 24 OUT OF SERVICE	SLS3
SLS39	REHABILITATION SEQUENCE: PIPE 66 OUT OF SERVICE	SLS3
SLS40	REHABILITATION SEQUENCE: PIPE 23 OUT OF SERVICE	SLS3

TABLE NUMBER	TABLE	APPENDIX NUMBER
SLS41	REHABILITATION SEQUENCE: PIPE 35 OUT OF SERVICE	SLS3
SLS42	REHABILITATION SEQUENCE: PIPE 72 OUT OF SERVICE	SLS3
SLS43	REHABILITATION SEQUENCE: PIPE 38 OUT OF SERVICE	SLS3
SLS44	REHABILITATION SEQUENCE: PIPE 37 OUT OF SERVICE	SLS3
SLS45	REHABILITATION SEQUENCE: PIPE 36 OUT OF SERVICE	SLS3
SLS46	REHABILITATION SEQUENCE: PIPE 79 OUT OF SERVICE	SLS3
SLS47	REHABILITATION SEQUENCE: PIPE 34 OUT OF SERVICE	SLS3
SLS48	REHABILITATION SEQUENCE: PIPE 21 OUT OF SERVICE	SLS3
SLS49	REHABILITATION SEQUENCE: PIPE 19 & 20 OUT OF SERVICE	SLS3
SLS50	REHABILITATION SEQUENCE: PIPE 27 OUT OF SERVICE	SLS3
SLS51	REHABILITATION SEQUENCE: PIPE 73 OUT OF SERVICE	SLS3
SLS52	REHABILITATION SEQUENCE: PIPE 18 OUT OF SERVICE	SLS3
SLS53	REHABILITATION SEQUENCE: PIPE 64 OUT OF SERVICE	SLS3
SLS54	REHABILITATION SEQUENCE: PIPE 52 OUT OF SERVICE	SLS3
SLS55	REHABILITATION SEQUENCE: PIPE 63 OUT OF SERVICE	SLS3
SLS56	REHABILITATION SEQUENCE: PIPE 74 OUT OF SERVICE	SLS3
SLS57	REHABILITATION SEQUENCE: PIPE 75 OUT OF SERVICE	SLS3
SLS58	REHABILITATION SEQUENCE: PIPE 28 OUT OF SERVICE	SLS3
SLS59	REHABILITATION SEQUENCE: PIPE 14 OUT OF SERVICE	SLS3
SLS60	REHABILITATION SEQUENCE: PIPE 11 OUT OF SERVICE	SLS3
SLS61	REHABILITATION SEQUENCE: PIPE 7 OUT OF SERVICE	SLS3
SLS62	REHABILITATION SEQUENCE: PIPE 8 OUT OF SERVICE	SLS3
SLS63	REHABILITATION SEQUENCE: PIPE 13,15 & 16 OUT OF SERVICE	SLS3
SLS64	REHABILITATION SEQUENCE: PIPE 48 OUT OF SERVICE	SLS3
SLS65	REHABILITATION SEQUENCE: PIPE 3 OUT OF SERVICE	SLS3
SLS66	REHABILITATION SEQUENCE: PIPE 47 OUT OF SERVICE	SLS3
SLS67	REHABILITATION SEQUENCE: PIPE 5 OUT OF SERVICE	SLS3
SLS68	REHABILITATION SEQUENCE: PIPE 46 OUT OF SERVICE	SLS3
SLS69	REHABILITATION SEQUENCE: PIPE 4 OUT OF SERVICE	SLS3
SLS70	REHABILITATION SEQUENCE: PIPE 6 OUT OF SERVICE	SLS3
SLS71	RECOMMENDED ORDER OF IMPROVEMENT TO SLS (IN REPORT AFTER PAGE SLS5)	
SLS72	FIRST STAGE OF REHABILITATION: YEAR 2020	SLS5
SLS73	SECOND STAGE OF REHABILITATION: YEAR 2020	SLS5
SLS74	THIRD STAGE OF REHABILITATION: YEAR 2020	SLS5
SLS75	FOURTH STAGE OF REHABILITATION: YEAR 2020	SLS5
SLS76	UNIMPROVED NETWORK: YEAR 2020 INPUT @ 160 FEET	SLS6
SLS77	UNIMPROVED NETWORK: YEAR 2020 INPUT @ 147 FEET	SLS6
SLS78	UNIMPROVED NETWORK: YEAR 2020 INPUT @ 140 FEET	SLS6
SLS79	UNIMPROVED NETWORK: YEAR 2020 INPUT @ 135 FEET	SLS6
SLS80	UNIMPROVED NETWORK: YEAR 2020 INPUT @ 100 FEET	SLS6
SLS81	UNIMPROVED NETWORK: CHARLESTOWN CONNECTOR: YEAR 2020	SLS7
SLS82	REHABILITATION: FIRST STAGE: CHARLESTOWN CONNECTOR: YEAR 2020	SLS7
SLS83	REHABILITATION: SECOND STAGE: CHARLESTOWN CONNECTOR: YEAR 2020	SLS7
SLS84	REHABILITATION: THIRD STAGE: CHARLESTOWN CONNECTOR: YEAR 2020	SLS7
SLS85	REHABILITATION: FOURTH STAGE: CHARLESTOWN CONNECTOR: YEAR 2020	SLS7
SLS86	REHABILITATION: FIFTH STAGE: CHARLESTOWN CONNECTOR: YEAR 2020	SLS7
SLS87	FIRE NEAR NODE 29: TOTAL HEAD @ 29=50.0 FEET: STUDY DAY: 2020	SLS8
SLS88	FIRE NEAR NODE 29: TOTAL HEAD @ 29=61.0 FEET: STUDY DAY: 1966	SLS8
SLS89	FIRE NEAR NODE 29: TOTAL HEAD @ 29=40.0 FEET: STUDY DAY: 1966	SLS8
SLS90	FIRE NEAR NODE 29: TOTAL HEAD @ 29=15.0 FEET: STUDY DAY: 1966	SLS8
SLS91	FIRE NEAR NODE 45: TOTAL HEAD @ 45=15.0 FEET: STUDY DAY: 1966	SLS8
SLS92	FIRE NEAR NODE 45: TOTAL HEAD @ 45=10.0 FEET: STUDY DAY: 1966	SLS8
SLS93	FIRE NEAR NODE 45: TOTAL HEAD @ 45= 0.0 FEET: STUDY DAY: 1966	SLS8

APPENDIX SHS

SOUTHERN HIGH SERVICE

TABLE OF CONTENTS

TABLE NO.	TABLE	APPENDIX NO.
SHS1	Study Day:1966; 1AM, 01:00 hours	SHS1
SHS2	Study Day:1966; 2AM, 02:00 hours	SHS1
SHS3	Study Day:1966; 3AM, 03:00 hours	SHS1
SHS4	Study Day:1966; 4AM, 04:00 hours	SHS1
SHS5	Study Day:1966: 5AM, 06:00 hours	SHS1
SHS6	Study Day:1966: 6AM, 06:00 hours	SHS1
SHS7	Study Day:1966; 7AM, 07:00 hours	SHS1
SHS8	Study Day:1966; 8AM, 08:00 hours	SHS1
SHS9	Study Day:1966; 9AM, 09:00 hours	SHS1
SHS10	Study Day:1966; 10AM, 10:00 hours	SHS1
SHS11	Study Day:1966; 11AM, 11:00 hours	SHS1
SHS12	Study Day:1966; 12N , 12:00 hours	SHS1
SHS13	Study Day:1966; 1PM, 13:00 hours	SHS1
SHS14	Study Day:1966; 2PM, 14:00 hours	SHS1
SHS15	Study Day:1966; 3PM, 15:00 hours	SHS1
SHS16	Study Day:1966; 4PM, 16:00 hours	SHS1
SHS17	Study Day:1966; 5PM, 17:00 hours	SHS1
SHS18	Study Day:1966; 6PM, 18:00 hours	SHS1
SHS19	Study Day:1966; 7PM, 19:00 hours	SHS1
SHS20	Study Day:1966; 8PM, 20:00 hours	SHS1
SHS21	Study Day:1966; 9PM, 21:00 hours	SHS1
SHS22	Study Day:1966; 10PM, 22:00 hours	SHS1
SHS23	Study Day:1966; 11PM, 23:00 hours	SHS1
SHS24	Study Day:1966; 12PM, 24:00 hours	SHS1
SHS25	Study Day:2020. Unimproved network	SHS1
SHS26	Study Day:2020. Improved network	SHS1
SHS27	Fire @ Node 15: Flow @ 14 MGD, 1966	SHS1
SHS28	Fire @ Node 26: 1966 Operation	SHS1
SHS29	Fire @ Node 30, Flow 15 MGD, 1966	SHS1
SHS30	Fire @ Node 43, Flow 6 MGD, 1966	SHS1
SHS31	Fire @ Node 46, Flow 4 MGD, 1966	SHS1
SHS32	Fire @ Node 51, Flow 30 MGD, 1966	SHS1
SHS33	Unimproved Network; 1966 Heads	SHS1
SHS34	50 PSI @ Node 27, Improved Network; 1972 MDC Heads	SHS1
SHS35	50 PSI @ Node 51, 1966 Consumptions, 1972 MDC Heads	SHS1
SHS36	80 PSI @ Node 51, 1966 Consumptions, 1972 MDC Heads	SHS1
SHS37	49 MGD @ 50 PSI; Node 51	SHS1
SHS38	27.5 MGD at 50 PSI; Node 51	SHS1
SHS39	80 PSI @ Node 51; Improved Network, 2020 Consumptions1966 Head	SHS1

TABLE NO.	TABLE	APPENDIX NO.
SHS40	Unimproved Network; 1972 Heads	SHS1
SHS41	Pipe 10, 23 Out of Service	SHS1
SHS42	Improved Network; 1972 Heads MDC Venture Meter 194 Out	SHS1
SHS43	All Major Pipes Rehabilitated	SHS1
SHS44	Major Pipes Cleaned; Pipe 10 Reduced 1972 Heads	SHS1
SHS45	All Pipes in Service; New 36" At Node 4	SHS1
SHS46	New 36" at Node 4; Pipe 50 Out of Service	SHS1
SHS47	New 36" at Node 4; Pipe 50 Cleaned	SHS1
SHS48	1966 System; Unknown Pipe Size at Node 4	SHS1
SHS49	1966 System; Unknown Pipe Size at Node 4, Major Pipes Rehabilitated	SHS1
SHS50	Rehabilitation Sequence Pipe 90 Out of Service	SHS1
SHS51	Rehabilitation Sequence Pipe 6 Out of Service	SHS1
SHS52	Rehabilitation Sequence Pipe 7 Out of Service	SHS1
SHS53	Rehabilitation Sequence Pipe 9 Out of Service	SHS1
SHS54	Rehabilitation Sequence Pipe 50 Out of Service	SHS1
SHS55	Rehabilitation Sequence Pipe 33 Out of Service	SHS1
SHS56	Rehabilitation Sequence Pipe 42 Out of Service	SHS1
SHS57	Rehabilitation Sequence Node 8 Out of Service	SHS1
SHS58	Unimproved Network: 1972 Heads; Node 8 Out of Service	SHS1
SHS59	First Phase of Rehabilitation, 1972 Heads	SHS1
SHS60	First Phase of Rehabilitation; Pipe 23 out of Service	SHS1
SHS61	First Phase of Rehabilitation;1972 heads	SHS1
SHS62	First Phase of Rehabilitation; 1966 Heads	SHS1
SHS63	Recommended Order of Improvements (in Report after page SHS6)	

APPENDIX HPFS

High Pressure Fire Service

TABLE OF CONTENTS

	TABLE NUMBER
1966 Operation; 150 psi at Pumps; 125 psi at Hydrants near Node 62	HPFS1
Maximum Capacity of Network to Deliver Hydrant Discharge at 20 psi Near Node 62	HPFS2
Study Day: 1966 Operation; 35 psi at Node 62	HPFS3
Study Day: 1966 Operation; 122 psi at Node 62	HPFS4
Study Day; 1966 Operation; 125 psi at Node 62	HPFS5

APPENDIX PH

Parker Hill

TABLE OF CONTENTS

APPENDICES

TABLES

PH1	Total Hydrant Discharge @ 10 PSIG
PH2	Effect of Small Total Head Variation
PH3	Total Hydrant Discharge @ 0 PSIG
PH4	Effect of Pipe Rehabilitation
PH5	Total Hydrant Discharge 3760 GPM
PH6	Fire Dkmand @ Node 20
PH7	Maximum Normal Demand
PH8	Maximum Normal Demand, Total Head = 240.5
PH9	Hydrant Discharge = 2250 GPM
PH10	Hydrant Discharge = 3760 GPM
PH11	Hydrant Discharge = 4450 GPM
PH12	Average Normal Demand
PH13	Effect of 6-Inch Connection
PH14	Huntington Avenue Out of Service
PH15	Heath Street Out of Service

MEMOS

1. Boston Water System, Parker Hill Hospital Meeting

2. Parker Hill

Boston Water

CHAPTER WSU

WATER SUPPLY AND USE

ABSTRACT: Sources of water and distribution to Boston by the MDC are outlined. Water use in Boston is discussed outlining area consumption patterns and annual, weekly and hourly variations in demand. An increase in average daily consumption from approximately 120 MGD to 238 MGD is estimated for the year 2020.

Charles A. Maguire and Associates

Boston Hartford Providence

WATER SUPPLY AND USE

CONCLUSIONS

The following conclusions were made:

1. Improvements to the MDC system will raise the minimum pressure at inputs to the Southern High Service (SHS) from 242 feet to approximately 270 feet.

2. An adequate supply of water will be available from the Metropolitan District Commission (MDC) for the near future. For long range needs, additional sources of supply will be sought by the MDC.

3. Annual water consumption is increasing. The trend for greater use of water and increasing numbers of daily commuters to Boston has overshadowed the recent decrease in Boston's resident population.

4. The increase in annual consumption is occurring chiefly during the spring and fall.

5. The hourly variation of water consumption is considerably different throughout the City.

6. Fifty of the largest water users account for approximately 10-percent of annual water use.

7. Leakage is concentrated in Boston Proper and accounts for approximately 10-percent of annual water use.

8. Fighting major fires requires approximately 7 to 15 MGD with standard fire fighting apparatus.

9. There were approximately 850,000 commuters to Boston in 1966. By the year 2020 an estimated 1,290,000 commuters are anticipated.

10. The average annual water consumption is expected to rise from approximately 120 MGD in 1966 to 238 MGD by the year 2020.

WSU1

WATER SUPPLY AND USE

SOURCES OF SUPPLY

The Metropolitan District Commission (MDC) is responsible for maintaining an adequate supply of potable water to the cities and towns surrounding Boston, Figure WSU1. For more than 75 years, the MDC has supplied increasingly larger quantities of water to more and more people, Figure WSU2. This trend for increasing use is expected to continue into the future. Since the MDC water distribution network interacts with the Boston water distribution network, changes in the levels of consumption in the MDC system will have some effect on the Boston distribution system.

Existing sources of supply, the Quabbin, Wachusett and Sudbury reservoirs and the Ware River presently (1967) have a maximum safe yield of 335 mgd. Diversions from the Miller River and other sources could increase this yield to approximately 520 mgd. The maximum long term projected needs of the cities and towns which may eventually be served by the MDC will exceed 520 mgd and alternative sources of supply will have to be ultimately found. Possible long range alternatives include desalinization of sea water and additional diversions from the Miller and Connecticut Rivers. (Legislative Research Council, Report Relative to Water Shortage and Industrial Water Use and Reuse, April 27, 1966)

The conveyance of water from the sources to the City of Boston is effected by the MDC network of aqueducts, large pipes and balancing reservoirs, Figure WSU1. The MDC has a continuing program of improvements to this network to ensure that adequate discharge can be delivered to Boston without excessive losses of pressure. However, increases in demand and decreases in hydraulic capacity caused by internal corrosion and tuberculation of large pipes have combined to result in undesirable low pressures at Boston. To counteract this, the open channel portion of the Wachusett Aqueduct has been replaced with a new 14-foot diameter pressure tunnel (the Wachusett-Marlborough Tunnel). This new tunnel will increase the capacity of the Hultman Aqueduct from 250 mgd to 375 mgd and will serve to maintain a full supply level of 274.5 feet at Norumbega Reservoir. As a result, the minimum total head at the City of Boston (Southern High Service) was increased by approximately 7 feet during 1967.

When completed in the early 1970's, the new 10-foot diameter MDC tunnel from Chestnut Hill Reservoir to the vicinity of the American Legion Highway and Morton Street in Boston will have a major affect on the operation of the Southern High Service. The principal affect will be to raise the minimum total head in the southeast section of the SHS from 242.0 feet to approximately 265.0 feet.

The scheduling of improvements to existing tuberculated MDC mains is somewhat complicated. At present (1967) it is not practical to temporarily shut off major MDC mains for rehabilitation because of resulting ill effects on the Boston distribution system. For this reason, the proposed improvements to the MDC supply system to Boston are presently limited to the addition of new major mains and aqueducts and to the raising of reservoir full supply levels. In the future, utilizing the increased flexibility which these additions will afford, it will be practical to plan an orderly schedule of rehabilitation for older large pipes.

WATER USE IN BOSTON

Gross Characteristics of Water Use: The trend for greater use of water and increasing numbers of daily commuters to Boston from other municipalities has overshadowed the recent decrease in Boston's resident population, Figure WSU3 and Table WSU1. Table WSU2 shows data compiled for days of highest demand (the maximum day) since 1956. The largest hourly consumption recorded (199 MGD) occurred on the peak day (146 MGD) of the 11 year period examined. On this day the ratio of the maximum hour to the average annual flow was 1.60. Table WSU2 shows no trend for annual increases in this ratio.

Seasonal Variation of Consumption: Water use in Boston is greatly dependent on the time of year. Figure WSU4 shows the seasonal variation of consumption for the 14-year period between 1953 and 1966. The records were well distributed between the maximum and minimum recorded weekly consumptions.

Figure WSU4 shows a large range of possible consumptions for any week of the year. A serial regression analysis of the 52 sets of 14 weekly records of the Southern Low Service showed that there was no strong tendency for winter or summer consumption to increase from year to year, Table WSU3. However, the spring and fall consumptions were shown to be increasing. The implication is that there is a tendency for the water consumption to become more uniformly distributed throughout the year. This may be a characteristic of a water supply system which lacks reserve capacity to deliver peak flows to an area growing in demand and variety of water users.

Hourly Variation in Consumption; The demand for water increases from a minimum at night to a maximum sometime during the day. Figure WSU5 shows this variation for a typical weekday of large consumption, Thursday, June 23, 1966. This day was chosen as the study day because average consumption was above normal and complete MDC records were not available for any other day during the period of field Pitometer measurements. (The study day is the day for which the performance of the system was evaluated) Weekend consumptions are generally smaller and may peak at different hours of the day.

A more detailed study showed that the hourly variations of consumption were considerably different throughout the city. Figure WSU6 shows hourly consumption curves for local areas. These curves were developed from field measurements and apply to areas surrounding the computer node points indicated by Table WSU4. The nodes can be located in Figures SLS1 and SHS1.

The techniques used to determine the hourly variation of consumption are outlined as follows:

Phase 1: Field pipe discharge measurements were made throughout the city over a a 24-hour period. This work was performed by Pitometer Associates during the summer of 1966.

Phase 2: Analysis and utilization of the field data was made by Maguire Associates to obtain the desired hourly distribution of consumption throughout the City. Like other experiments, an intensive analysis of the field measurements was required. The analysis was necessary to supplement the data and to account for and evaluate some of its deficiencies. Briefly, the analysis involved correlation and regression analysis of the Pitometer data (obtained at various locations over a 4-month period) and the continuously recorded system inputs at MDC venturi meters. The resulting multiple linear regression equations were used to generate synthetic Pitometer data for a study day (Appendix WSU4). The synthetic data was then used to develop the dimensionless hourly consumption curves. These were pro-rated to nodes in the network on the basis of average consumptions derived from land use and population density studies. The allocation of hourly node consumptions was optimized (using a linear programming method) so that the minimum deviation from the measured total system input on the study day was achieved over the 24-hour period. The solution was constrained to maintain the average daily consumption constant at nodes while the shape of the node loading curve was altered slightly to minimize hourly deviations from the total system input. A complete description of the method can be found elsewhere (Appendix WSU6). The entire analysis was performed on digital computers, most of it in the time-sharing mode with access to extensive on-line data storage.

Confidence in the method was gained by the good agreement between the distribution of flows in the network computed by SDP (the network analyzer program) and the synthetic gauging point data. A check with the original Pitometer data is somewhat meaningless since the field data was not recorded on a single day. Nevertheless, general qualitative agreement with the Pitometer data was achieved and served as a guarantee that no major errors had accumulated during the analysis.

Exceptional Demands: Large local demands for water are made by major water users, needs for fire fighting, and leakage.

Meter records of the Water Division billing department were used to identify 50 of the major water users in the City, Appendix WSU1. The average daily consumption of these major users accounts for approximately 10 percent of the total consumption in the City.

Major fires requiring large localized volumes of water are shown on Figure WSU7 for the period 1964 to 1966. The terms 3-alarm, 4-alarm and 5-alarm indicate that 11, 15 and 19 pumpers respectively were utilized at the indicated fires. Most pumpers have a rated capacity of 750 gpm. Rare fires requiring more than 19 pumpers were recorded as 5-alarm fires. The concentration of fires in the Roxbury section is attributed by Fire Department officials to the large number of abandoned and neglected buildings and the high population density, Table WSU7 and Figure WSU8. As urban renewal proceeds there will be a change in the numbers and locations of fires. Discussion with the Fire Department and examination of MDC records indicates that major fires in the past have required, at peak discharge, approximately 5,000 to 10,000 gpm (from 7 to 15 MGD) with standard fire fighting apparatus.

Leakage from unknown sources amounts to approximately 10 percent of the total consumption of the City. Leakage surveys and the results of data analysis for the present study indicate that much of this leakage is concentrated in Boston Proper. Since a major renewal program is under way in this area, it should be possible to significantly reduce leakage as new construction proceeds and further leak detecting surveys are made.

Forecasting Future Needs: The future growth of population and changing patterns of land use will have a significant effect on both water consumption and revenue. It was therefore essential to make a careful evaluation of predictions made by all levels of government, university study groups, planning bureaus, and other engineers. This evaluation resulted in an overall picture of the range of possible resident and commuter populations up to the year 2,020 and an appreciation for the factors which led to these predictions, Figure WSU9, Table WSU6. The nationally recognized trend for an increase in per capita water consumption was examined and modified to suit conditions in the City of Boston. The effects of changing technology and possible changes in legislation and administrative practice were also incorporated subjectively into the study.

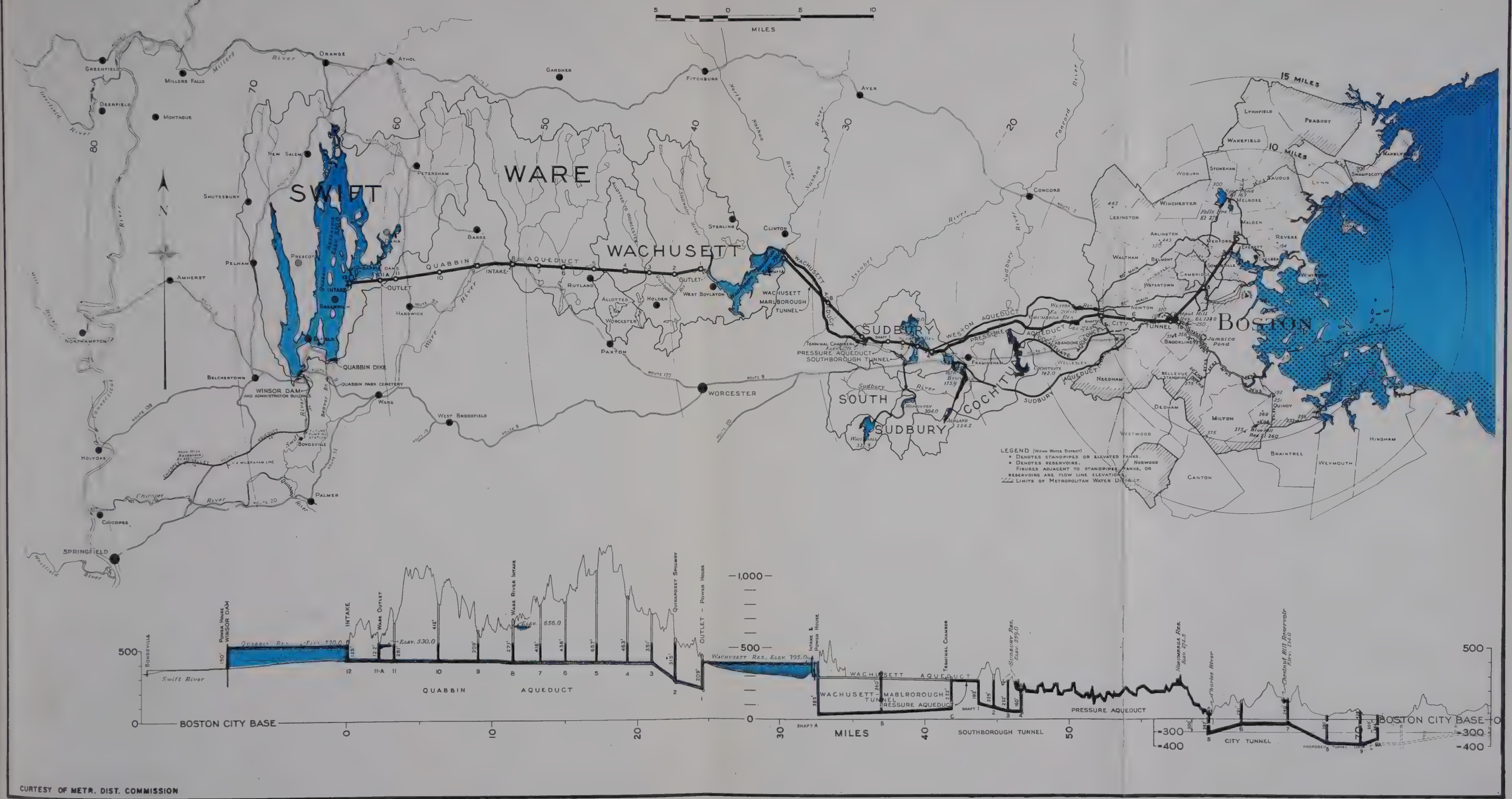
With the above information and a plan of programmed changes in land use (furnished by the Boston Redevelopment Authority) the range of future changes in total water consumption, Figure WSU9, and changes in the overall pattern of consumptions within the city were anticipated to the year 2,020.

The future changes in the pattern of consumptions, indicated by Table WSU7, were next examined in finer detail for each census area. Aerial photos and

land use plans were used to pro-rate the increased consumptions to nodes in each census area. There were no areas in which major future changes in land use were anticipated and it was not necessary to reassign dimensionless node loading curves. The anticipated consumption patterns for 2020 are presented in Table WSU4 and Table WSU5. Figure WSU10 shows the corresponding expected hourly variation in demand of the Southern Low and High Services on a day comparable to the study day of 1966.

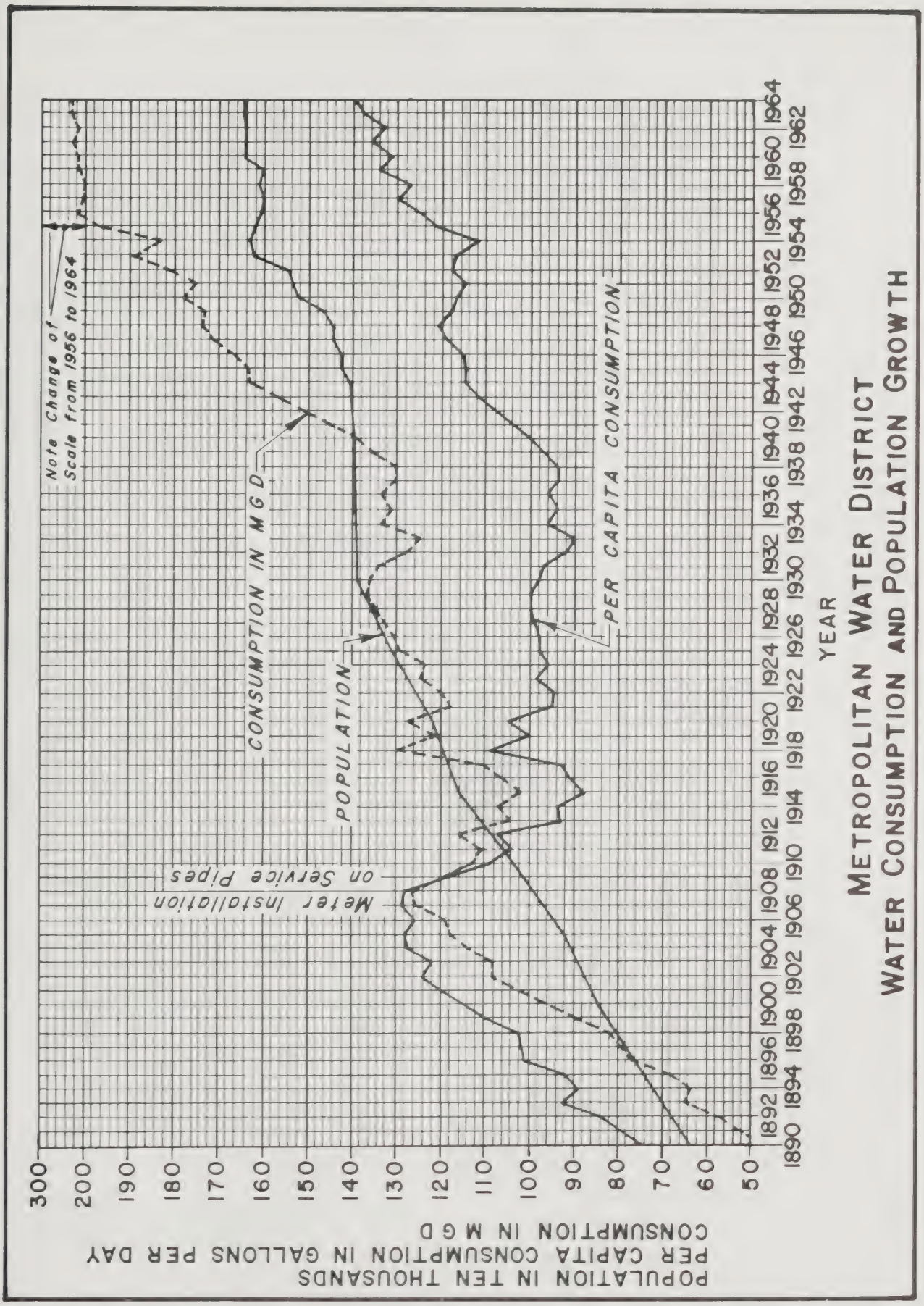
While the expected useful lifetime of new additions to the water system extends far beyond the year 2020, the scope of the analysis was not extended because of the very great uncertainties involved. It was deemed to be more useful to incorporate sufficient flexibility into the design of improvements to facilitate future changes.

WATER SUPPLY — METROPOLITAN BOSTON



BOSTON WATER

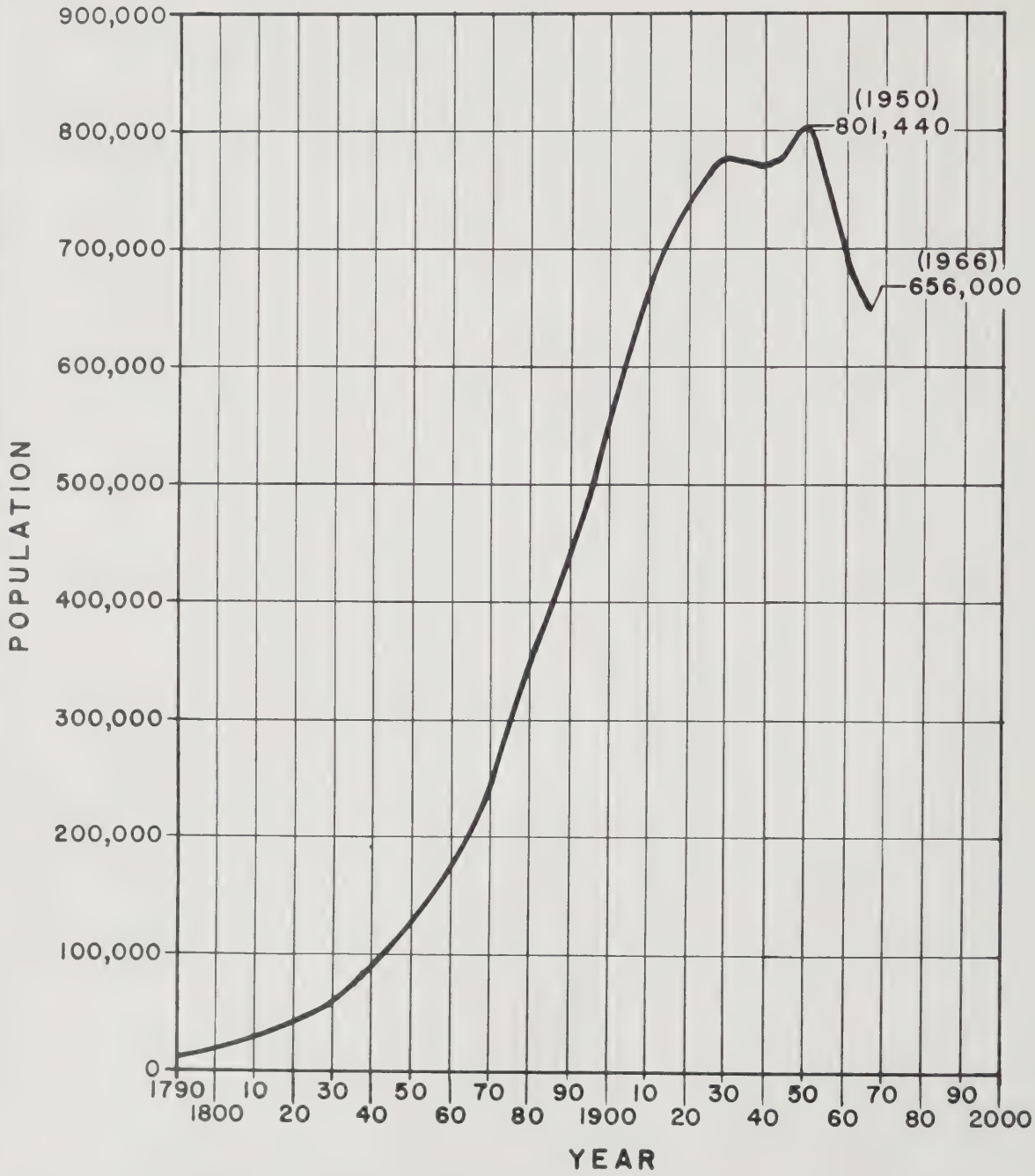
FIGURE – WSU1



FIGURE—WSU 2

BOSTON WATER

FIGURE—WSU 2

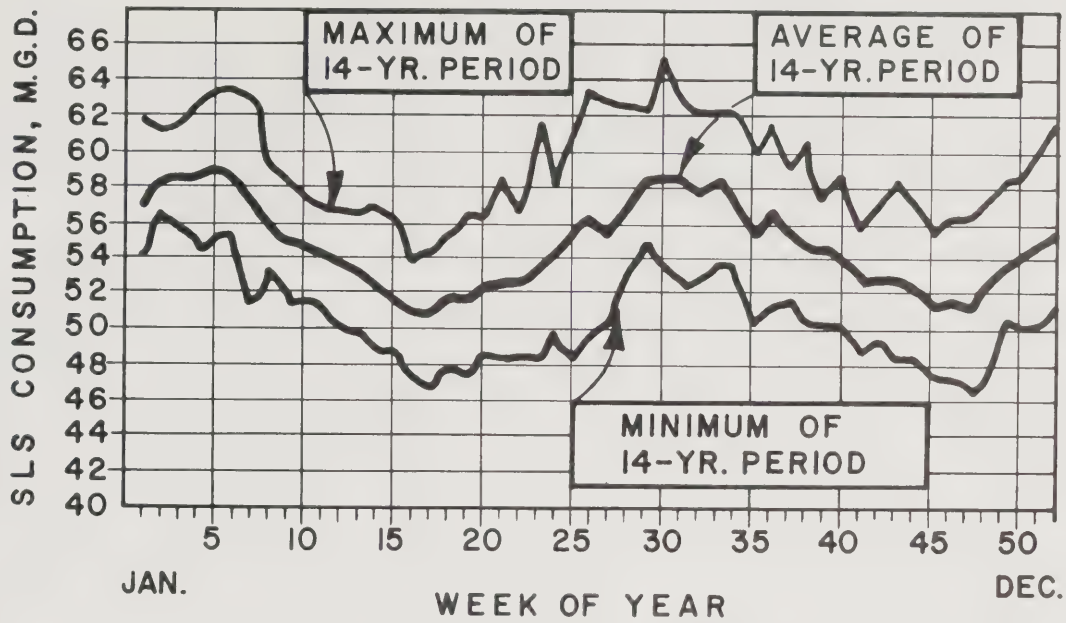


BASED ON U.S. CENSUS

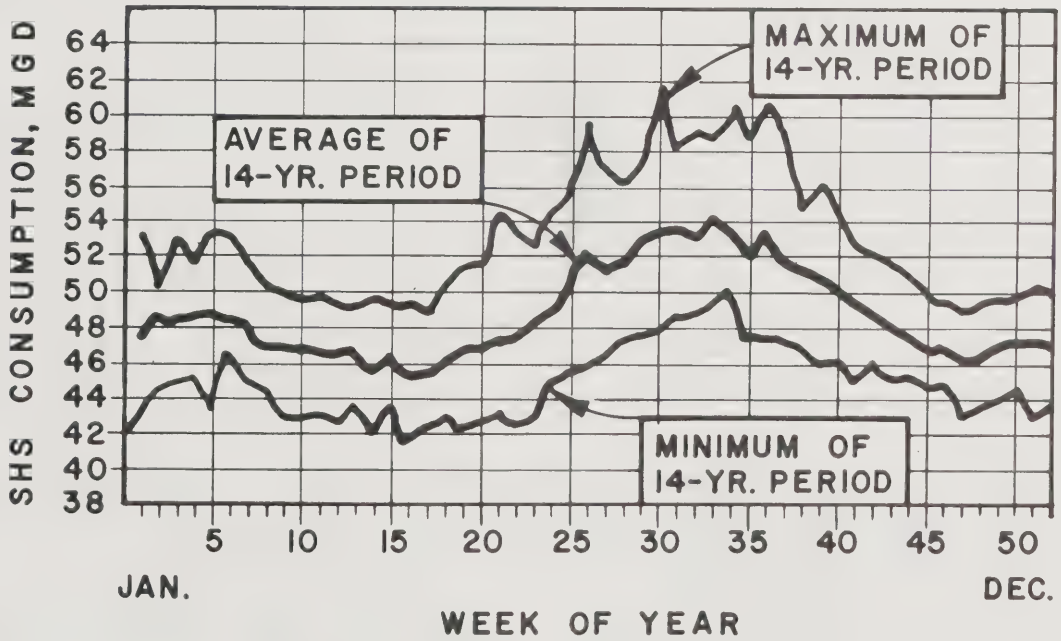
PAST POPULATION TRENDS
CITY OF BOSTON

BOSTON WATER

FIGURE-WSU 3



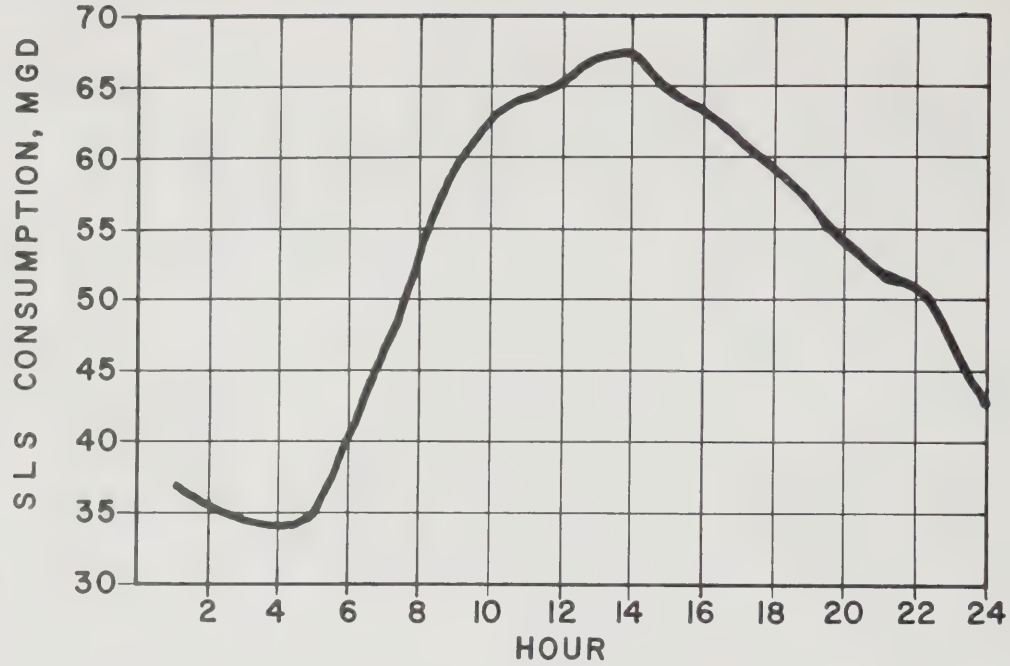
SOUTHERN LOW SERVICE



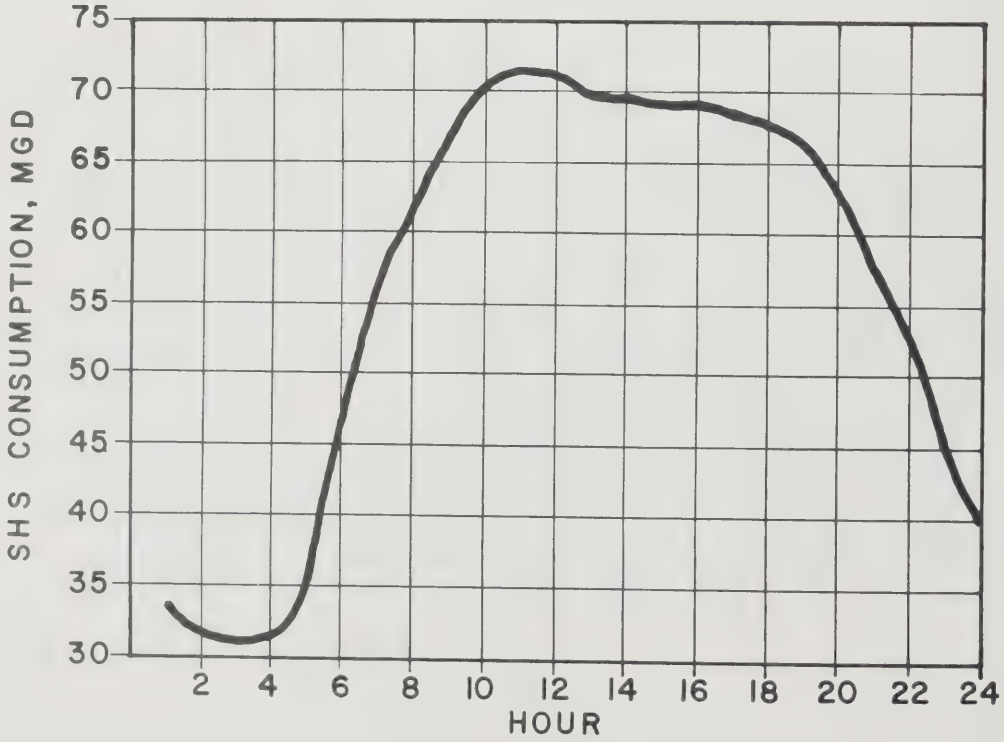
SOUTHERN HIGH SERVICE

SEASONAL VARIATION OF CONSUMPTION
1953 TO 1966

BOSTON WATER **FIGURE—WSU 4**



SOUTHERN LOW SERVICE

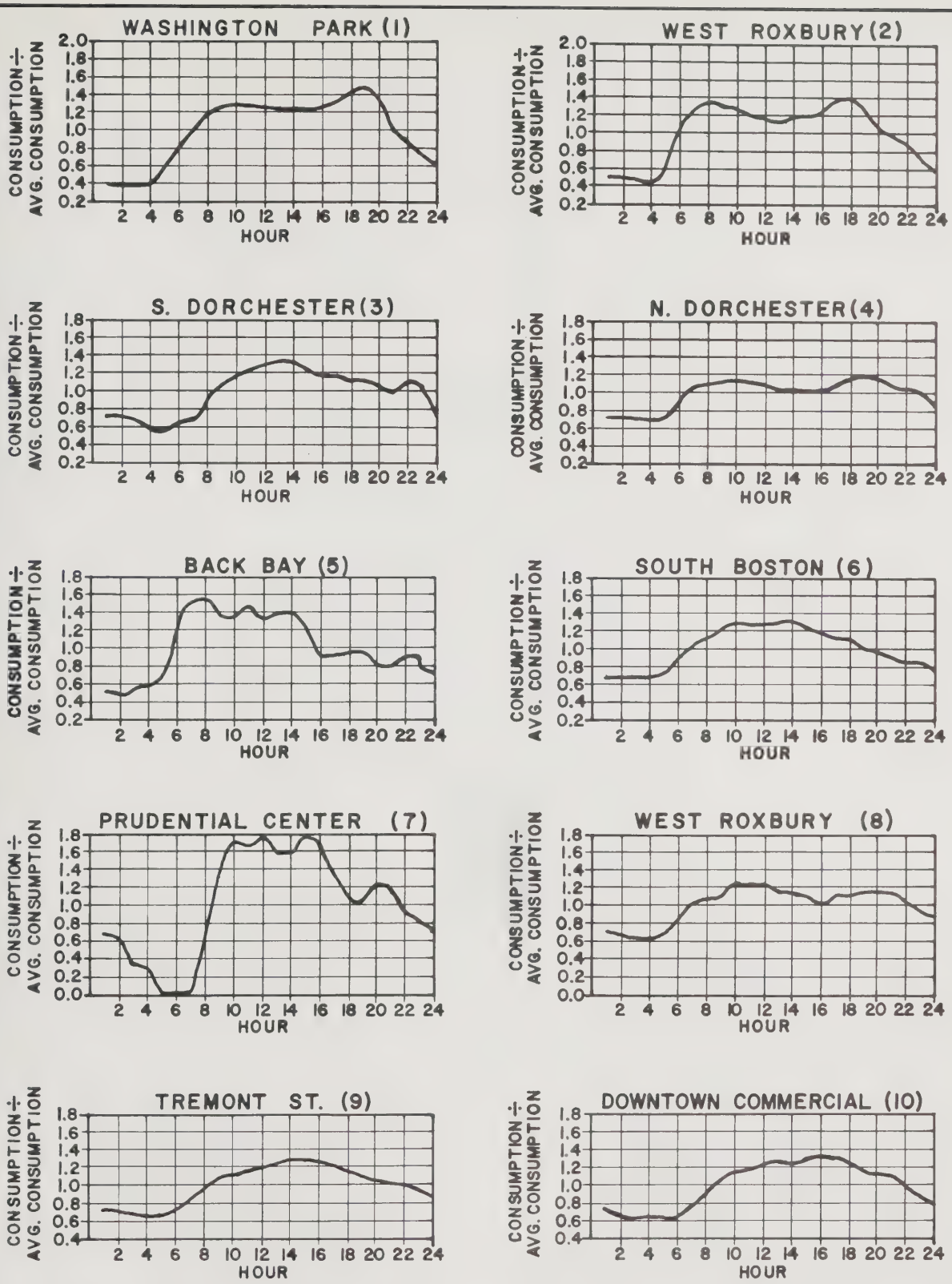


SOUTHERN HIGH SERVICE

HOURLY VARIATION OF CONSUMPTION
STUDY DAY, THURSDAY, JUNE 23, 1966

BOSTON WATER

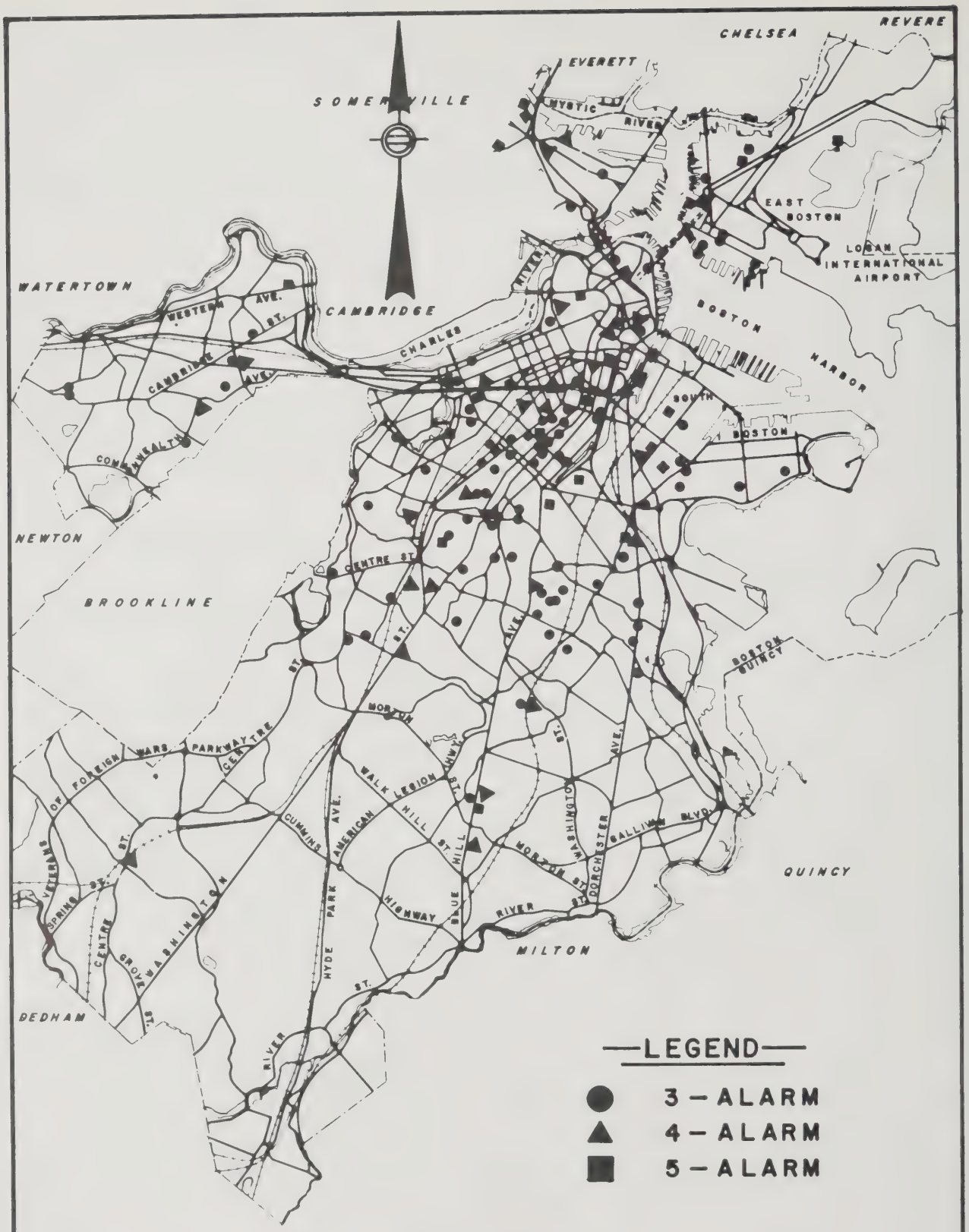
FIGURE—WSU 5



DIMENSIONLESS DEMAND CURVES

CITY OF BOSTON

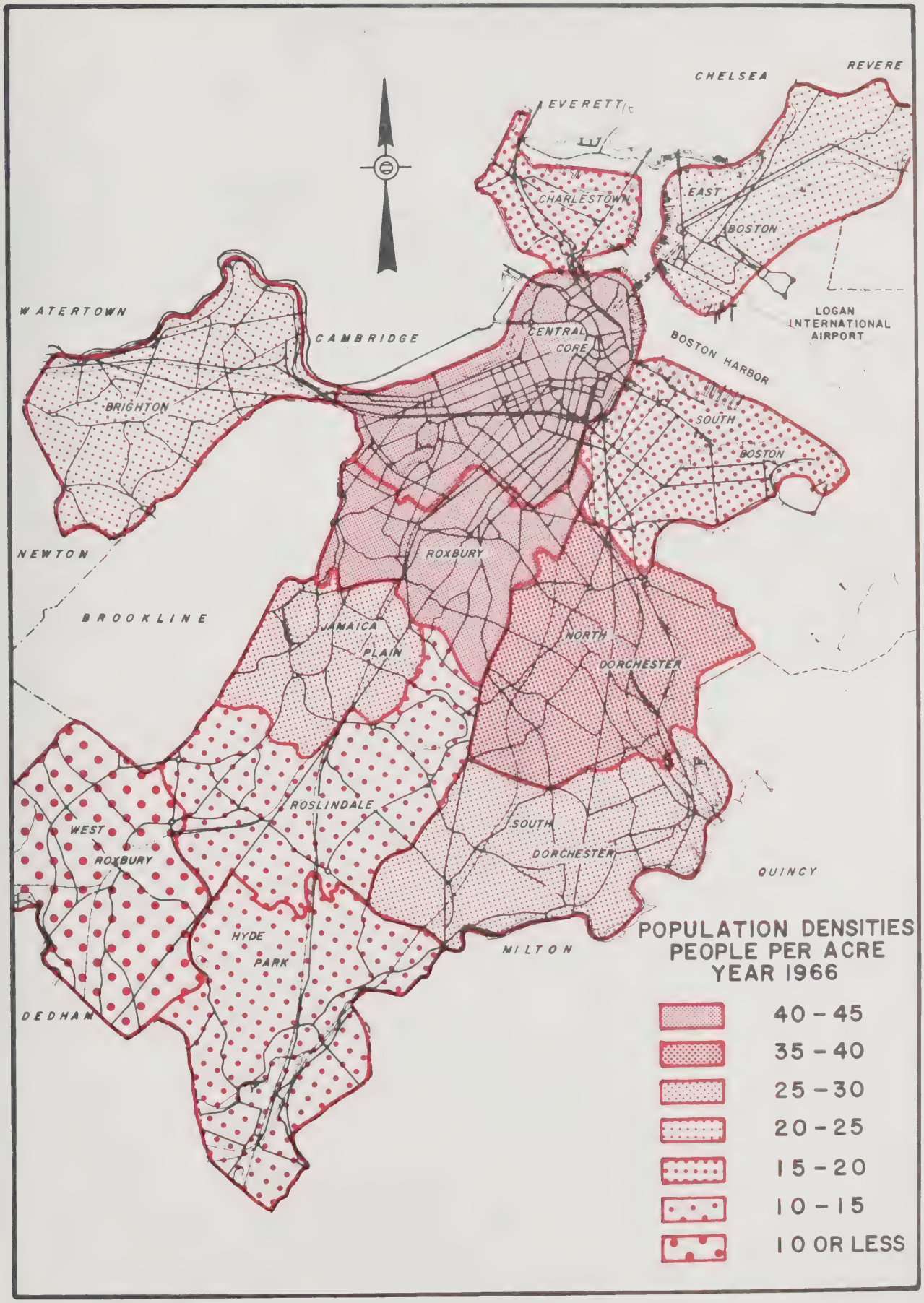
BOSTON WATER FIGURE-WSU6



LOCATION OF MAJOR FIRES
1964 — 1966

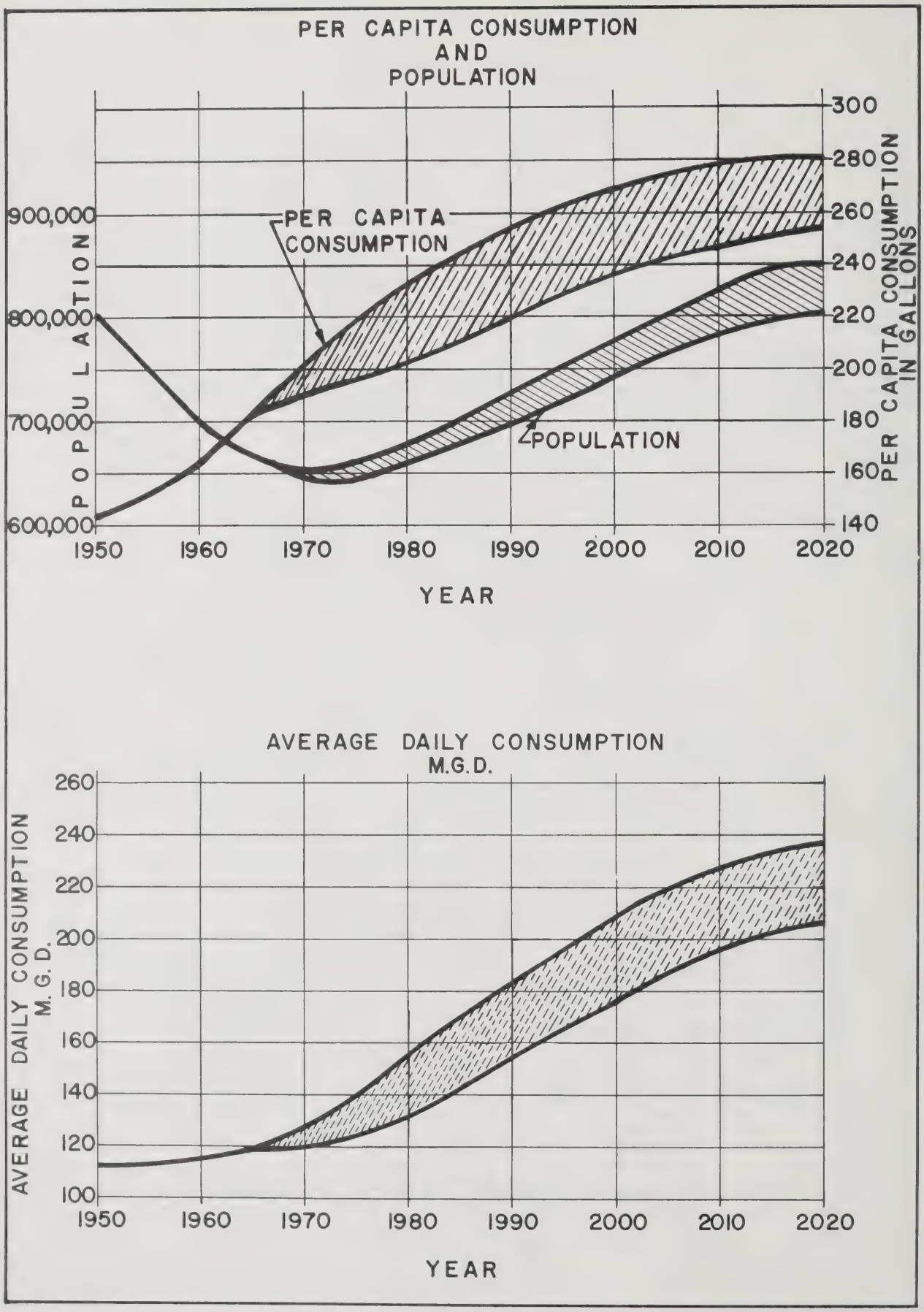
BOSTON WATER

FIGURE—WSU 7



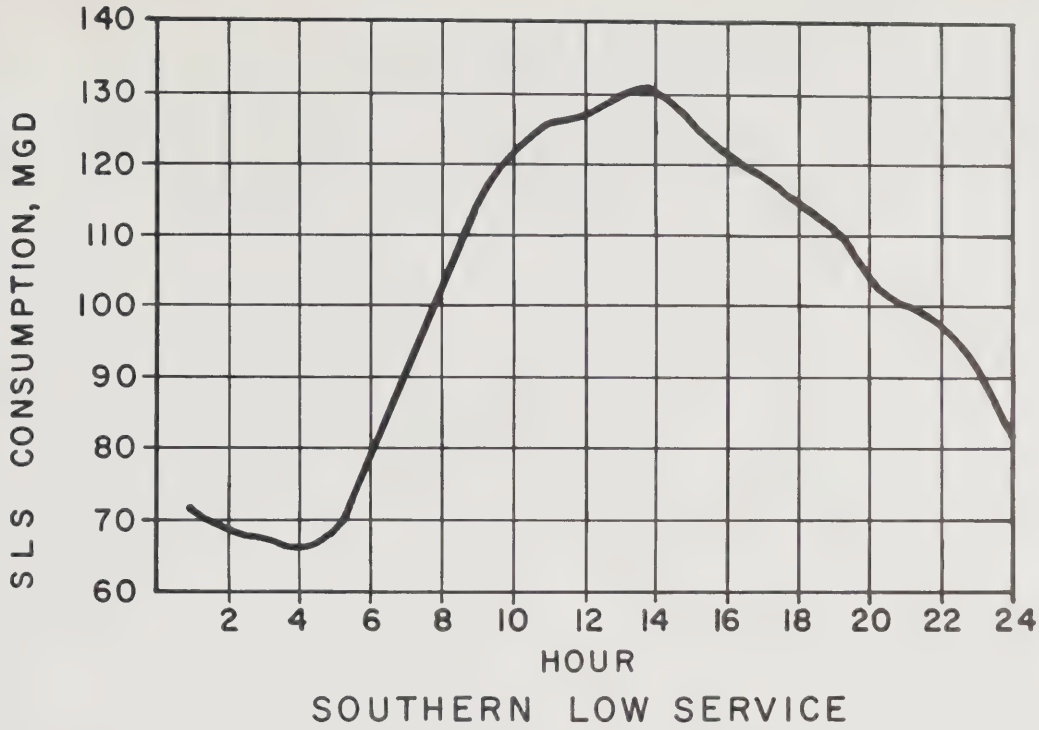
BOSTON WATER

FIGURE - WSU 8

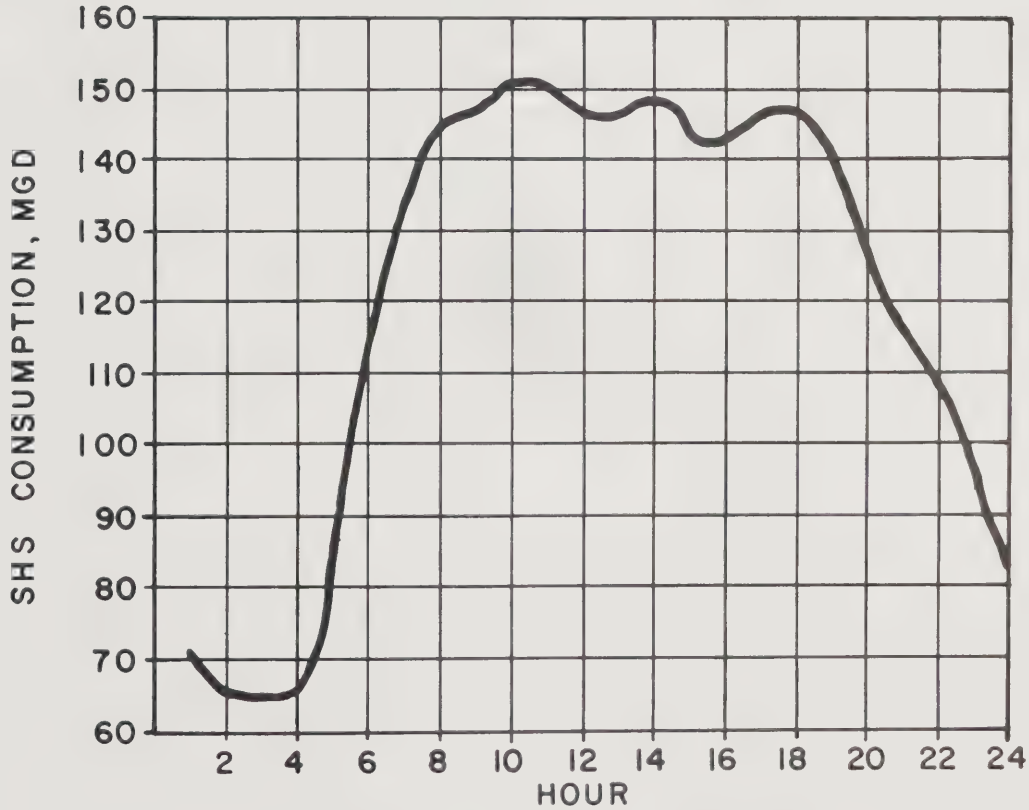


BOSTON WATER

FIGURE-WSU9



SOUTHERN LOW SERVICE



SOUTHERN HIGH SERVICE

HOURLY VARIATION OF CONSUMPTION
STUDY DAY: YEAR 2020

BOSTON WATER

FIGURE – WSU 10

TABLE WSU1

TOTAL WATER CONSUMPTION IN BOSTON, 1940-1966

YEAR	POPULATION	AVERAGE DAILY CONSUMPTION M G D	PER CAPITA CONSUMPTION GALLONS
1940	770,816	94.8	123
1941	772,000	97.7	127
1942	775,200	102.1	132
1943	778,500	106.0	136
1944	781,000	109.6	140
1945	785,000	110.6	141
1946	787,500	110.9	141
1947	791,000	117.4	148
1948	795,000	117.4	147
1949	797,500	113.7	143
1950	801,400	113.0	141
1951	790,000	112.1	142
1952	780,000	114.2	146
1953	770,000	113.4	147
1954	760,000	110.3	145
1955	750,000	112.6	150
1956	740,000	113.6	154
1957	730,000	112.4	154
1958	720,000	110.9	154
1959	710,000	115.9	163
1960	697,197	116.1	166
1961	690,000	120.5	175
1962	682,000	117.2	172
1963	674,000	121.3	180
1964	665,000	122.1	184
1965	659,000	119.1	182
1966	656,000	118.3	180

TABLE WSU2

MAXIMUM CONSUMPTION IN BOSTON

YEAR	MAXIMUM DAY M G D	MAXIMUM HOUR M G D	RATIO MAXIMUM HOUR TO MAXIMUM DAY	RATIO MAXIMUM HOUR OF YEAR TO AVERAGE DAILY CONSUMPTION
1966	131.03	176.24	1.34	1.50
1965	138.54	182.09	1.32	1.59
1964	144.01	193.35	1.34	1.53
1963	146.25	198.80	1.36	1.60
1962	132.09	181.35	1.37	1.53
1961	139.42	188.14	1.35	1.56
1960	121.96	177.25	1.35	1.40
1959	137.63	183.40	1.34	1.52
1958	126.10	173.89	1.38	1.63
1957	136.38	191.75	1.41	1.61
1956	127.45	173.49	1.36	1.50
Average	135.70	183.60	1.35	1.55

TABLE WSU3

Weekly Serial Regression Coefficients (Lag of 1 week)
Southern Low Service, 1953 to 1966

Approx. Date	Week of Year	Regression Coefficient	Approx. Date	Week of Year	Regression Coefficient
Jan. 1	1	-0.06		27	+0.00
	2	-0.01		28	+0.41
	3	+0.33		29	+0.37
	4	+0.23		30	-0.19
	5	+0.04		31	+0.17
	6	+0.07		32	+0.04
	7	-0.09		33	-0.21
	8	-0.05		34	-0.04
	9	+0.02		35	-0.38
	10	-0.09		36	+0.04
March 23	11	-0.27		37	-0.08
	12	-0.29		38	+0.29
	13	+0.14		39	+0.23
	14	+0.36		40	+0.12
	15	+0.10		41	+0.02
	16	+0.22		42	+0.40
	17	+0.29	Oct. 27	43	+0.39
	18	+0.44		44	+0.44
	19	+0.47		45	+0.39
	20	+0.44		46	+0.84
	21	+0.37		47	+0.25
	22	+0.50		48	+0.59
	23	+0.42		49	+0.17
June 17	24	+0.04		50	+0.10
	25	+0.26		51	-0.25
	26	+0.29	Dec. 31	52	-0.20

TABLE WSU4

COMPUTER NODES AND CONSUMPTIONS
SOUTHERN LOW SERVICE

NODE	DEMAND CURVE 1966	STUDY DAY CONSUMPTION (MGD) 1966	2020	NODE	DEMAND CURVE 1966	STUDY DAY CONSUMPTION (MGD) 1966	2020
1	5	.34	.59	29	10	.26	.45
2	9	.45	.78	30	9	.56	.97
3	9	.57	1.03	31	9	.41	.71
4	9	.34	.61	32	9	1.20	2.07
5	9	.85	1.53	33	10	1.08	1.87
6	3	4.20	7.25	34	10	.68	1.18
7	5	.68	1.36	35	10	.68	1.18
8	5	2.00	3.45	36	10	.68	1.18
9	5	2.10	3.63	37	10	.98	1.70
10	7	.68	1.18	38	10	.68	1.18
11	9	1.20	2.94	39	10	.68	1.18
12	9	1.60	2.88	40	10	1.18	2.04
13	9	1.50	2.70	41	10	.68	1.18
14	10	.62	1.12	42	10	.68	1.18
15	4	1.10	1.98	43	6	.26	.60
16	9	1.10	1.90	44	6	1.50	3.45
17	9	.77	1.33	45	6	.46	1.06
18	10	1.30	2.24	46	6	.50	1.15
19	6	.42	.73	47	6	.53	1.22
20	9	1.50	2.70	48	6	1.00	2.30
21	3	1.60	4.77	49	10	2.50	4.32
22	9	2.10	3.63	50	6	.80	1.85
23	3	1.00	2.60	51	6	.60	1.38
24	10	.27	.46	52	6	.80	1.85
25	9	.34	.59	53	3	1.50	4.47
26	6	.97	2.24	54	6	.54	1.25
27	6	.17	.39	55	6	.36	.83
28	6	.26	.60				

TABLE WSU5

Computer Nodes and Consumptions
Southern High Service

NODE	DEMAND CURVE 1966	STUDY DAY CONSUMPTION (MGD) 1966	2020	NODE	DEMAND CURVE 1966	STUDY DAY CONSUMPTION (MGD) 1966	2020
1	5	.9	1.62	35	2	.9	2.68
2	5	.4	.72	36	2	.7	2.09
3	5	2.1	3.78	37	2	.7	2.09
4	5	2.3	5.30	38	2	.8	2.39
5	2	.6	1.39	39	6	.6	1.79
6	5	.3	.54	40	10	.6	1.79
7	5	.2	.38	41	2	.5	1.49
8	5	.4	.72	42	6	.8	2.39
9	5	.8	1.51	43	6	.5	1.15
10	8	.1	.19	44	10	1.2	3.59
11	8	.6	1.13	45	2	.8	1.97
12	8	.8	1.51	46	1	1.5	3.70
13	8	1.8	3.24	47	2	.7	1.45
14	5	.8	1.44	48	2	.1	.19
15	10	.1	.17	49	2	.1	.21
16	10	.1	.17	50	2	1.2	2.26
17	5	.7	1.20	51	10	7.9	13.70
18	5	.4	.72	52	8	.3	.57
19	10	.1	.17	53	2	.5	1.46
20	10	.4	.69	54	2	1.1	3.22
21	10	.2	.34	55	1	1.2	3.59
22	10	.1	.17	56	2	1.0	2.96
23	10	.8	1.38	57	2	.8	2.39
24	6	1.4	3.22	58	8	.2	.38
25	6	.5	1.15	59	8	.2	.38
26	6	.2	.42	60	8	.5	.95
27	6	.9	2.08	61	5	.3	.54
28	6	.7	1.62	62	8	.5	.95
29	6	.1	.23	63	1	.7	1.79
30	10	2.0	3.46	64	1	.8	2.39
31	6	.8	1.85	65	2	.9	1.86
32	2	.5	1.15	66	2	.2	.46
33	2	1.6	3.70	67	2	.2	.59
34	2	.9	2.68				

TABLE WSU6

DAILY COMMUTERS TO BOSTON

Regional Core	1966	2000	2020
Workers	300,000	400,000	440,000
Other	350,000	410,000	450,000
TOTAL	650,000	810,000	890,000
Ratio: Commuters to Residents	5.95	7.52	7.40
Outside Regional Core			
All Purposes	200,000	350,000	400,000
City Total	850,000	1,160,000	1,290,000
Ratio: Commuters to Residents	1.29	1.50	1.63

TABLE WSU7

ESTIMATING FUTURE POPULATIONS AND WATER CONSUMPTIONS

	POPULATION									Area	Population Density		1966-2020 Percent Population Increase	Average Water Consumption MGD		Water Consumption MGD Study Day Year 2020
	1966	1970	1975	1980	1985	1990	1995	2000	2020	Acres	1966	2020		1966	2020	
Brighton	58,500	58,200	58,500	59,000	60,962	63,275	66,137	69,000	75,000	2,856	21	26	22%	4.4	8.2	8.8
Charlestown	16,381	16,281	16,280	17,500	18,587	20,025	21,512	22,000	27,000	982	17	27	43%	7.6	18.3	19.6
N. Dorchester	103,677	100,687	100,677	101,000	102,500	104,000	106,000	108,000	118,000	2,813	37	42	13%	9.8	27.2	29.2
S. Dorchester	69,118	67,118	68,437	70,000	71,712	75,275	79,387	85,000	95,000	3,200	22	30	27%	11.8	23.8	25.5
E. Boston	39,000	39,000	38,200	38,500	42,462	45,775	49,137	51,500	55,000	1,820	21	30	29%	5.1	10.6	11.3
South Boston	38,146	38,146	38,146	40,000	42,713	45,775	48,388	50,000	56,000	2,171	18	26	32%	12.5	26.8	28.8
Roxbury	75,265	75,265	75,260	76,000	76,713	77,775	78,888	80,000	86,000	1,884	40	46	17%	14.9	25.0	26.8
West Roxbury	28,900	29,000	31,000	38,200	41,738	44,125	45,563	48,500	53,500	3,013	10	18	46%	4.7	12.8	13.7
Jamaica Plain	42,400	41,400	42,000	43,800	44,063	45,175	46,388	47,000	51,000	1,720	25	30	17%	5.3	9.3	10.0
Roslindale	38,700	39,000	40,000	43,000	43,463	44,775	46,138	48,000	51,000	3,028	13	17	24%	1.6	3.1	3.3
Hyde Park	39,800	39,000	40,500	45,000	48,087	51,525	55,012	58,500	62,500	3,163	13	20	36%	2.8	6.5	6.9
City Core	109,113	106,113	107,000	107,000	107,000	107,500	107,500	107,500	120,000	2,750	40	44	9%	41.4	66.7	71.5
Total	659,000	650,000	655,000	679,000	700,000	725,000	750,000	775,000	850,000	35,350	20	24	23%	118.3	238.0	255.4

Boston Water

CHAPTER DN

THE DISTRIBUTION NETWORKS

ABSTRACT: The distribution system has three main pressure levels with overlapping of pressure levels in certain areas. The pipe is almost exclusively cast iron and is very old and in general is badly tuberculated. Corrosion surveys and pressure tests should be used in the field to determine the expected remaining useful life of existing pipes. Pressure surges may assume importance as the consumption rate increases, the pipe ages further and automatic equipment is installed in either the Boston or MDC system.

Charles A. Maguire & Associates

Boston Hartford Providence

CONCLUSIONS

The following conclusions were made:

1. The operation of the MDC water system and the location of major inputs to the Boston system have a major effect on the operation of the Boston distribution network. A major change in either system will have effects upon the other.

2. The water supply to Boston by the MDC is among the most corrosive of waters presently consumed in major cities of the United States.

3. Most of the pipes in Boston have suffered a serious loss of hydraulic capacity because of internal corrosion and tuberculation. Hazen-Williams coefficients for principal mains in the City range between approximately 40 and 130.

4. The very large variation in total head which occurs in Boston during the day can be partially attributed to hydraulic losses in the MDC system leading to Boston.

5. Many of the pipes in the MDC system are of the same age and material as the major mains in Boston and have suffered a correspondingly serious loss of hydraulic capacity.

6. Before major MDC pipes can be temporarily put out of service for cleaning and cement lining, it is necessary to make major improvements to the Boston system or to provide alternative sources of water from the MDC.

7. The external corrosion of cast iron pipe results in graphitization of the pipe material. These corrosion products have a lower structural strength than the original cast iron pipe. In some areas where field inspections indicate that important trunk mains are badly graphitized, it may be practical to line badly corroded pipe with steel. The steel liner could be grouted and cement-lined to preclude further corrosion.

8. A preliminary corrosion survey of certain areas of West Roxbury indicated a very high soil resistivity and a corresponding low potential for corrosion. Judging by the good performance of the very old cast iron pipes in other sections of the City, it may be inferred that external corrosion is not a major problem in Boston. There may be local areas of low soil resistivity where extensive corrosion does occur. These areas could be pinpointed by an extensive corrosion survey.

9. In order to fully utilize a rehabilitated trunk main system, it is necessary to rehabilitate the smaller distribution pipes as well. The cost of cleaning and cement-lining these many small mains would be approximately 50 million dollars.

10. In highly urbanized areas of the city, the cost of pipe itself is not as significant as the cost of laying it. In less urbanized areas, the choice of less expensive pipe materials may produce significant savings.

11. The operation of MDC pumps does not contribute to pressure surges in the Boston network because of equalizing reservoirs on the discharge side of the pumps.

12. Calculations show that approximately 20 seconds is required for a pressure wave to travel across the Boston network and back to the point of propagation. This means that valve closures shorter than 20 seconds in duration may be considered instantaneous and will cause large pressure surges.

13. The very slow closure rates of existing valves in the Boston system and the good natural damping characteristics of the distribution network have reduced the importance of transient pressure waves in the past. Anticipated increases in demand for water and installation of automatic equipment in both the MDC and Boston systems will increase the relative importance of transients in the future.

14. The newly installed, automatically operated butterfly valve in the MDC low service system at Chestnut Hill Reservoir is a potential source of major transient pressures in the Boston system. This automatic valve has not been in service long enough to give confidence in its operation through experience. A major main failure in the Boston system could cause a rapid response from this valve and a resulting damaging pressure surge.

15. The capacities of trunk mains in Charlestown and East Boston are adequate for present needs.

16. Future requirements for additional trunk main capacity in Charlestown can be met by interconnection with the proposed 36-inch trunk main extending between Andrew Square, Charlestown, and Boston Proper, and rehabilitation of existing, unlined trunk mains in Charlestown.

17. Large reservoirs in the Boston water distribution system are not required if the trunk mains are rehabilitated.

RECOMMENDATIONS

The following recommendations are made:

1. The program for upgrading the Boston system will interact with a similar program for the MDC distribution network. It is recommended that close cooperation between the two programs be achieved.

2. An experimental field program to evaluate the extent and costs of beneficial effects of water treatment to control corrosion should be investigated. At the same time other alternatives to conventional cement-lining of cast iron pipes should be considered.

3. Since normal cleaning and cement-lining practice requires excavation at frequent intervals, a systematic method for choosing desirable locations for excavations should be developed. Surveys by competent corrosion engineers should be used to aid in the selection of locations for exposing pipe at likely severely corroded areas.

4. Most of the trunk mains in Boston are probably in good structural condition. In order to preclude the possibility of overlooking a structurally unsound, important, trunk main, it is recommended that field tests be incorporated as part of the routine cleaning and cement-lining program. These tests should include pressurizing the pipe to approximately 10 psi above normal maximum pressure prior to cleaning, dewatering and inspection of the interior surface of the pipe by a competent corrosion engineer. If these tests indicate further data would be desirable, additional excavations may be made to inspect the external condition of the pipe.

5. A competent hydraulic, corrosion engineer should work closely with the Water Division to evaluate and determine the cause of major pipe failures which occur in the future. This practice is followed in other major cities and requires close coordination between the Water Division and the corrosion engineer.

6. If existing large diameter pipe is deemed to be unreliable, consideration should be given to the use of a grouted steel liner of slightly smaller diameter. This steel liner could be installed inside existing unreliable pipe and may prove to be an economical and practical solution to the replacement of major trunk mains in crowded city locations.

7. The economics involved in the choice of pipe material should be carefully re-examined. Cement asbestos pipe could be used to good advantage to replace existing smaller distribution mains on dead ends where poor quality water occurs. Concrete encased steel cylinder pipe should be used where economical and soil conditions are extremely aggressive to metallic pipe.

8. A continuing program to locate the major sources of leakage in the distribution networks should be coupled with new construction in BRA areas. These leakage surveys should be initially concentrated in Boston Proper.

THE DISTRIBUTION NETWORKS

INTRODUCTION

The Boston water system is composed of four major distribution networks, the Southern Low Service, Northern Low Service, Southern High Service, and Southern Extra-High Service. The approximate maximum static water levels of these services are as follows:

1.	Southern Low Service -	172 feet
2.	Northern Low Service -	160 feet
3.	Southern High Service -	260 feet
4.	Southern Extra-High Service -	395 feet

The aerial extent of the service levels is, in general, determined by ground elevations (Figure DN1), although some areas are served by more than one service level.

Approximately 90% of the water consumed in Boston is distributed through the Southern Low and Southern High Services. Approximately two-thirds of the remaining 10% is distributed by the Northern Low Service. The average daily consumption for the year ending December 31, 1965 was approximately 120 million gallons and as discussed previously (Chapter WSU) by the year 2020, 238 million gallons may be consumed on an average day in Boston.

The four service levels consist of approximately 1,100 miles of mains, ranging in size from 4 inches to 48 inches in diameter, (Table DN1). There are approximately 95 thousand individual services from 5/8 inches to 12 inches in diameter, all of which are metered.

There are no storage facilities, except the Bellevue standpipe in West Roxbury, within the distribution system of the City of Boston, although the MDC maintains reservoirs at nearby Chestnut Hill and Spot Pond. While the system is considered to be a gravity one for insurance rating purposes, acceptable minimum pressure during periods of high demand can only be maintained by pumping in the MDC system at Chestnut Hill just outside of Boston. The extremely high elevations of the Southern Extra-High Service require pumping at all times.

The Boston system is supplied from the MDC network by 24 metered connections of varying sizes,(Table DN3). The locations of these connections to a large extent govern the behavior of the Boston system. As shown on Figure DN2, the MDC distribution system overlaps the Boston system in several areas. There is a high degree of interaction between the two systems and major changes in either may have correspondingly large effects upon the other.

HYDRAULIC EVALUATION OF PIPES

Most of the pipes in Boston were installed many years ago and there has been a major deterioration in their capacity to convey water. Figures DN3 and DN4 show the locations, sizes, and dates of installation of the major pipes in the City of Boston. A comprehensive field study was carried out to obtain hydraulic data for evaluation of these mains (Pitometer Report Trunk Main Survey, 1966), Figures DN8 and DN9. Careful evaluation of these data was used to determine the Hazen-Williams coefficient of the principal mains in the city. (These coefficients are shown on figures in other chapters of this report.)

Many of the pipes in the MDC system are of the same age and material as the major mains in Boston. Figures DN5 and DN6 show how the total head varies with discharge at the principal MDC venturi meters supplying Boston. The very large variation in total head indicated by most of these charts shows that rather large hydraulic losses occur in the MDC system. It may be inferred that the structural and hydraulic condition of these MDC mains is similar to those in the City of Boston. Because of the strong interaction between the two systems, it is evident that any program for upgrading the Boston system should include provision for similar compatible upgrading of the MDC system. The coordination of the two rehabilitation programs will require close cooperation between the organizations concerned. Before major MDC pipes can be temporarily shut down for cleaning and lining, extensive improvements to the Boston system are necessary to allow the redistribution of water from the remaining connected MDC supply lines.

ALTERNATIVES TO CEMENT LINING

The smaller distribution pipes in Boston are of the same general vintage as the trunk mains and have corresponding structural strength and poor hydraulic performance. The rehabilitation of these mains is a monumental task because unlike the trunk main system for which great improvements can be made by rehabilitating key mains, the elimination of red water conditions and low hydrant discharges can only be achieved by rehabilitating each small pipe contributing to the undesirable conditions. The cost of cleaning and cement lining the entire system of small mains would be in the neighborhood of 50 million dollars. Realizing that the total water consumption in Boston will more than double in the coming decades, there is little doubt that this program, or a suitable alternative, is required.

The water supply provided to Boston by the MDC is among the most corrosive of waters presently consumed in major cities of the United States. A preliminary study showed that a combination of cleaning without cement lining followed by water treatment to control corrosion may provide a viable economical alternative for Boston. Unfortunately, the preliminary

survey was unsuccessful in identifying the optimum method of treatment or in evaluating the degree of effectiveness which can be expected from this alternative to cleaning and cement lining. Keeping the long range prospects in mind, it is recommended that some experimental field program be undertaken on a limited scale to evaluate this and other alternatives to conventional in situ cement lining of cast iron pipes.

PIPE MATERIALS

At the present time (1967) cast iron and steel pipe are used exclusively in the distribution system of the City of Boston. The major supply lines of the MDC do , however, have certain lengths which are reinforced steel cylinder, concrete encased pipe. While there have been no major problems in the past with cast iron and steel pipe in the City, it may be advantageous to consider the use of other materials such as the steel cylinder pipe in areas where appreciable savings in cost or increased reliability can be achieved.

In certain types of soils, concrete pipe is more resistant to external corrosion than metal pipe. Hence if the external loading conditions are within the tolerances of concrete pipe and if the pipe leads to a net cost saving, there is no reason why it should not be considered as an alternative to cast iron or steel for major trunk mains.

In some cities, cement-asbestos pipe is used to replace existing smaller distribution mains on dead ends where poor water quality occurs. This practice could be adopted in Boston if the overall economics of using cement-asbestos pipe are favorable.

Savings may be expected from the initial cost of the pipe, freedom from corrosion and resulting long useful life and the ease of handling the relatively light weight small diameter asbestos-cement pipe. Items resulting in potential increased costs include the high quality bedding required and possible changes in tapping equipment and practice.

The approximate cost of laying new cast iron and concrete cylinder pipes in Boston is given in Table DN2. . In highly urbanized areas of the City the cost of the pipe itself is not as significant as it is in other areas where installation costs are lower. Steel pipe may be substituted for cast iron with little appreciable effect on the cost figures presented here for estimating purposes. Costs will be higher if new pipe is to be laid in the ledge or drumlin areas shown on Figure DN7.

EXTERIOR CORROSION

Corrosion of cast iron pipe results frequently in a graphitization of the pipe material. The graphite material is structurally capable of withstanding moderate internal pressures under some conditions. Hence in areas of high elevation where pressures are normally quite low, corroded cast iron pipe may have an indefinitely long useful life. In other areas, subjected to severe external loadings or high average pressures or surges, the graphitized pipe may eventually fail.

General practice in many areas has been to clean and line corroded cast iron pipe to restore hydraulic capacity. Many cities have not investigated the structural strength of such corroded pipe nor have they estimated its remaining useful life prior to cleaning and lining. Other cities have found that graphitized cast iron pipe is subject to numerous failures from moderate internal pressures (as low as 50 or 60 psi) and from external loadings due to heaving soils or new construction.

A preliminary effort was made to determine if competent corrosion engineers could reliably predict the extent of corrosion of in situ cast iron pipe without recourse to extensive excavations. This preliminary study showed that while the extent of corrosion could be estimated, the indication was not sufficiently complete to permit evaluation of the remaining useful life of individual pipes or of their behavior under slightly increased maximum pressures. It was concluded that corrosion surveys, including the investigation of pipe to soil potential and the electrical and chemical soil properties do not provide all of the data necessary to evaluate the anticipated future behavior of individual pipes. Additional information must be gained in the field through pressure testing of isolated mains, de-watering and visual inspection of the interior of previously cleaned trunk mains and visual inspection of the external condition of the pipe at a number of excavations. This information can be expediently obtained at the time that the pipe scheduled for rehabilitation is temporarily taken out of service for cleaning.

The pressure tests should be confined to pressures only slightly greater than normal maximums (perhaps 10 psi). The purposes of the pressure tests would be to estimate the leakage in the main prior to cleaning and lining, to determine the tightness of valves and to insure that the pipe is not corroded to the extent that small increases in pressure will cause significant damage. After pressure-testing the mains should be de-watered and a visual inspection of the interior condition of the pipe, the joints and the valves, made by a qualified engineer. If the interior of the pipe appears to be badly corroded, it would be desirable to inspect the exterior at several locations where electrical measurements suggest that active corrosion is taking place.

On the basis of the above field investigation, the validity of the present assumption that most or all of the trunk mains are worthy of cleaning and cement-lining and need not be replaced with new pipe may be verified or disproved. If it is found necessary to replace existing pipes or to use grouted steel liners, additional engineering studies will be necessary to determine the best size and location of the new pipes.

It should be emphasized that after an extensive study of available methods for predicting the extent of in situ corrosion, it was concluded that a field inspection of the interior and exterior surfaces and pressure testing of the pipe are necessary for estimating the future value of an in situ pipe.

PRESSURE SURGES

Pressure surges in the Boston Water System are caused by rapid valve closures or main breaks. The operation of pumps in the MDC system does not contribute to pressure surges in the Boston network because of equalizing reservoirs on the discharge side of the pumps.

The magnitude of transient pressures has not been measured in the Boston system. However, calculations show that the time constant for the system is approximately 20 seconds (the time of travel of a pressure wave across the network and back). This means that valve closures made in intervals shorter than 20 seconds may be considered instantaneous. For each 1-foot per second velocity change within this time interval, a maximum pressure surge of approximately 50 psi will be imposed on the network.

To date there have been no known problems with transients, chiefly because the valves in the system are gear-operated gate valves with very slow closure times. A possible source of trouble exists, however, on the MDC system which supplies Boston with water. In the Low Service pumping station of the MDC, there is a new automatically-operated butterfly valve which diverts water into Chestnut Hill Reservoir in response to a pressure sensing element. It is conceivable that a major break in the Boston system could cause a rapid response from this automatic valve which would result in damaging pressure surges. It is recommended that the controls for this valve be set to regulate closure to an extremely slow rate. If additional automatic-operating equipment is installed in either the Boston or the MDC system in the future, a careful evaluation of possible high transient pressures should be made to determine an acceptable mode of operation.

CHARLESTOWN

The Charlestown section of Boston is expected to grow in population from 16,381 in 1966 to approximately 27,000 in the year 2020. Water consumption in 1966 averaged approximately 7.6 MGD and this is expected to increase to approximately 20 MGD in the year 2020. Field data show that compared to the rest of Boston, water consumption is fairly uniformly distributed throughout the day. This indicates that the major users of water in Charlestown are the industrial and commercial interests.

Ground elevations in Charlestown vary from sea level to approximately 100 feet. A link with the Southern High Service in Boston Proper provides high pressure water for the higher elevations. The bulk of the supply, however, is obtained from two MDC low service meter stations in Perkins Street and Broadway Street at the Somerville-Charlestown boundary. From these two meters, water is fed to consumers in Charlestown via the major 16-inch, 24-inch and 20-inch low service pipes in Main Street, Medford Street and Chelsea Street respectively. An additional 16-inch pipe in Rutherford Avenue parallels the Main Street pipe between Halford and Chelsea Streets. A grid of smaller pipes, mostly 6-inch diameter, is highly interconnected with the major mains. A 16-inch main connected to the Southern High Service in Boston Proper leads from the Warren Avenue bridge to Monument Square at the top of Bunker Hill. The high service consumers are primarily residential and the total requirement is less than 1 MGD.

Evaluation and Recommendations: The capacities of trunk mains are adequate for present needs. Future requirements based on population forecasts indicate the need for additional trunk main capacities between the Somerville-Charlestown boundary and the easterly portion of Charlestown. This additional capacity could be achieved by interconnection with the 36-inch main recommended for construction in conjunction with highway I-695 construction between Andrews Square, Charlestown, and the existing highway stub of the Warren Avenue bridge. The connection of this additional trunk main to the existing trunk mains could be made most advantageously in the vicinity of City Square.

The proposed trunk main improvement for Charlestown, if implemented, will considerably improve operation of the Southern Low Service in Boston Proper and South Boston. Because of this and in order to coordinate the water system improvements with new highway and bridge construction, it is recommended that the trunk main improvements for Charlestown be given early consideration for implementation.

Most of the pipes in Charlestown are exceptionally old and require cleaning and cement-lining. A major program for cleaning and cement-lining is therefore

indicated to be necessary The Boston Redevelopment Authority (BRA) has scheduled major redevelopment for the Charlestown area. This redevelopment includes provision for replacement of 6-inch and 8-inch pipes by 8-inch and 10-inch pipes respectively in those areas undergoing redevelopment. A schedule of improvements to smaller mains should be closely tied to the BRA's reconstruction program in Charlestown and should include eventual cleaning and cement-lining of the entire grid of small distribution mains. The City Square connection to the new 36-inch pipe suggested above will provide flexibility to allow rehabilitation of existing trunk mains in Charlestown.

EAST BOSTON

Water consumption in East Boston totalled approximately 5.1 MGD in 1966 and is expected to rise to 11.3 MGD by the year 2020, reflecting an increase in population from 39,000 to 55,000. The variation in the rate of demand during the day results in daily pressure variations of approximately 15 feet.

The basic grid of trunk mains consists of the 20-inch main in Border Street, a 30-inch main in Chelsea Street, a 24-inch pipe in Chelsea Street from Prescott Street leading to Cottage Street, and 16-inch mains which complete the grid between Border Street and Brooks Street. A grid of smaller mains contains many 6-inch, 8-inch, and 10-inch diameter pipes and is highly interconnected with the major trunk mains.

The grid of trunk mains is more than adequate for present demands and if cleaned and lined where necessary, will be adequate for future consumptions. While East Boston should be included in the long-range program for rehabilitation of all pipes in Boston, this area is in less need of urgent attention than many others.

INTERNAL STORAGE IN THE BOSTON SYSTEM

There is no internal storage reservoir presently used within the City of Boston distribution system. Careful consideration was given to the possibility of augmenting the distribution system with elevated storage tanks or underground reservoirs to supplement the basic trunk main system during periods of high demand. There does not appear to be any need for such storage within the system as the rehabilitated trunk main systems will be more than adequate to supply peak demands.

THE EXTRA HIGH SERVICE

The Extra High Servie (EHS) provides water to areas of very high elevation in West Roxbury and Hyde Park. Maximum total heads of approximately 400 feet are generated at the Hyde Park and Brookline pumping stations of the MDC. The combined discharge from these pumping stations represented approximately 3% of the average 1965 consumption in Boston. The Bellevue standpipe has an overflow elevation of approximately 400 feet and a maximum storage capacity of approximately 5,000,000 gallons. This reservoir serves to reduce variations in pressure throughout the day and to provide a reserve for emergency demands.

Maximum and minimum pressures of 117 psi and 26 psi in the EHS result from differences in elevation. At high elevations, fire flow tests made by the National Board of Fire Underwriters in 1950 showed that large discharges were not available. It is recommended that a program of cleaning and cement-lining in the EHS initially concentrate on those pipes leading to high elevations. The remaining pipes in the EHS should be rehabilitated as part of the overall program for the City. The EHS could be used to advantage for field experiments with water treatment to control tuberculation of cleaned but unlined cast-iron pipe.

LEAKAGE

In addition to the resulting loss of revenue, leakage penalizes the network's capacity to deliver emergency flows. A concerted effort to locate and eliminate large sources of leakage should be undertaken in conjunction with the new construction underway as part of the Boston Redevelopment Program. In the future, a continuing program of leakage surveys could pay its own way by locating leakage as it occurs. Many large cities consider leakage surveys as a normal part of their operating and maintenance program. This practice is recommended for Boston.

Previous leakage surveys made in Boston have disclosed large amounts of leakage. The present study indicated that leakage in Boston Proper may be as much as 6 MGD.

NOTES:
1. FOR BOSTON CITY DATUM ADD 5.65 FEET TO ELEVATIONS SHOWN.
2. 20 FOOT CONTOUR INTERVALS ABOVE ELEVATION 20 FEET.

TOPOGRAPHY—USGS DATUM

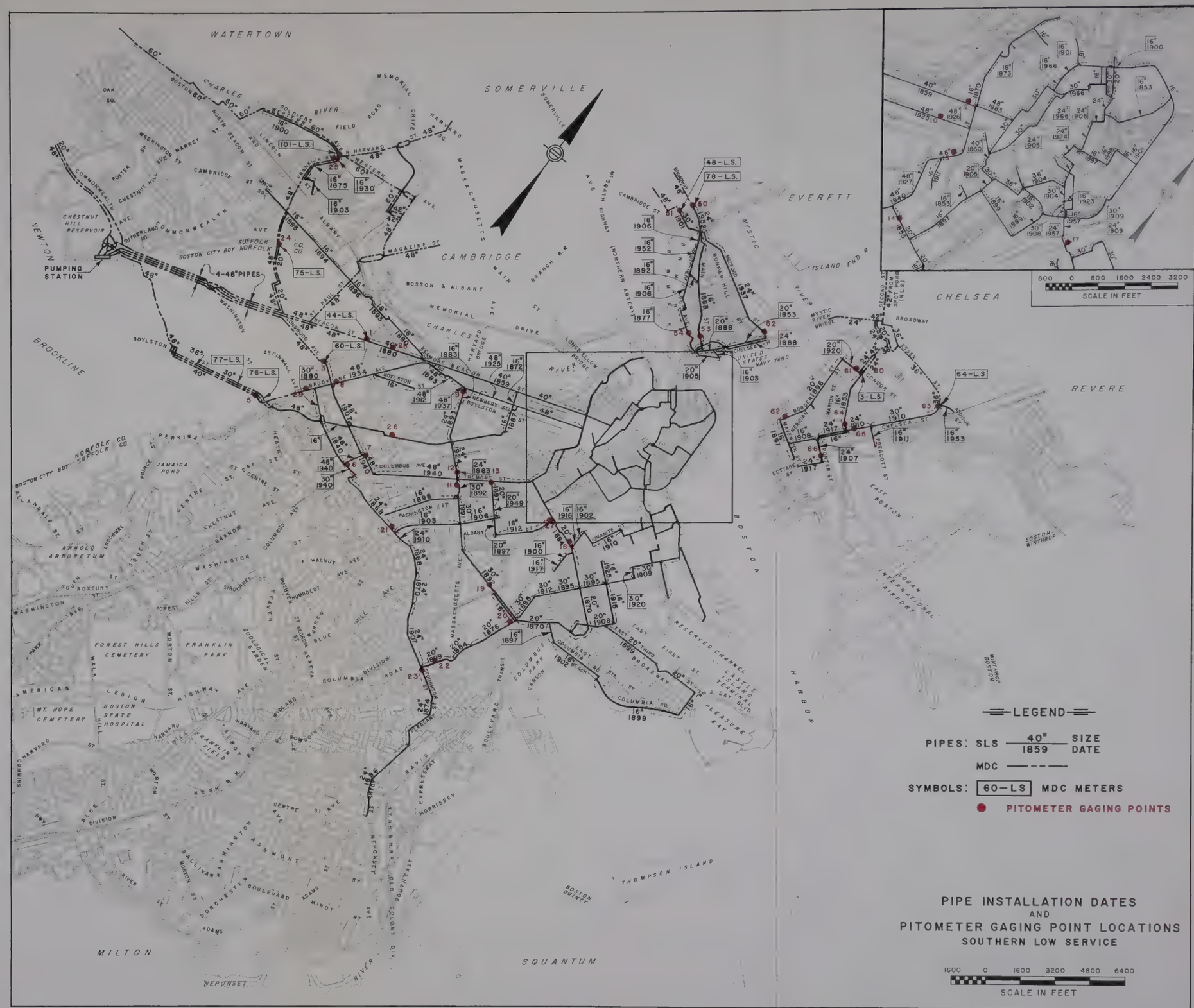
1600 0 1600 3200 4800 6400
SCALE IN FEET

BOSTON WATER

FIGURE—DN I

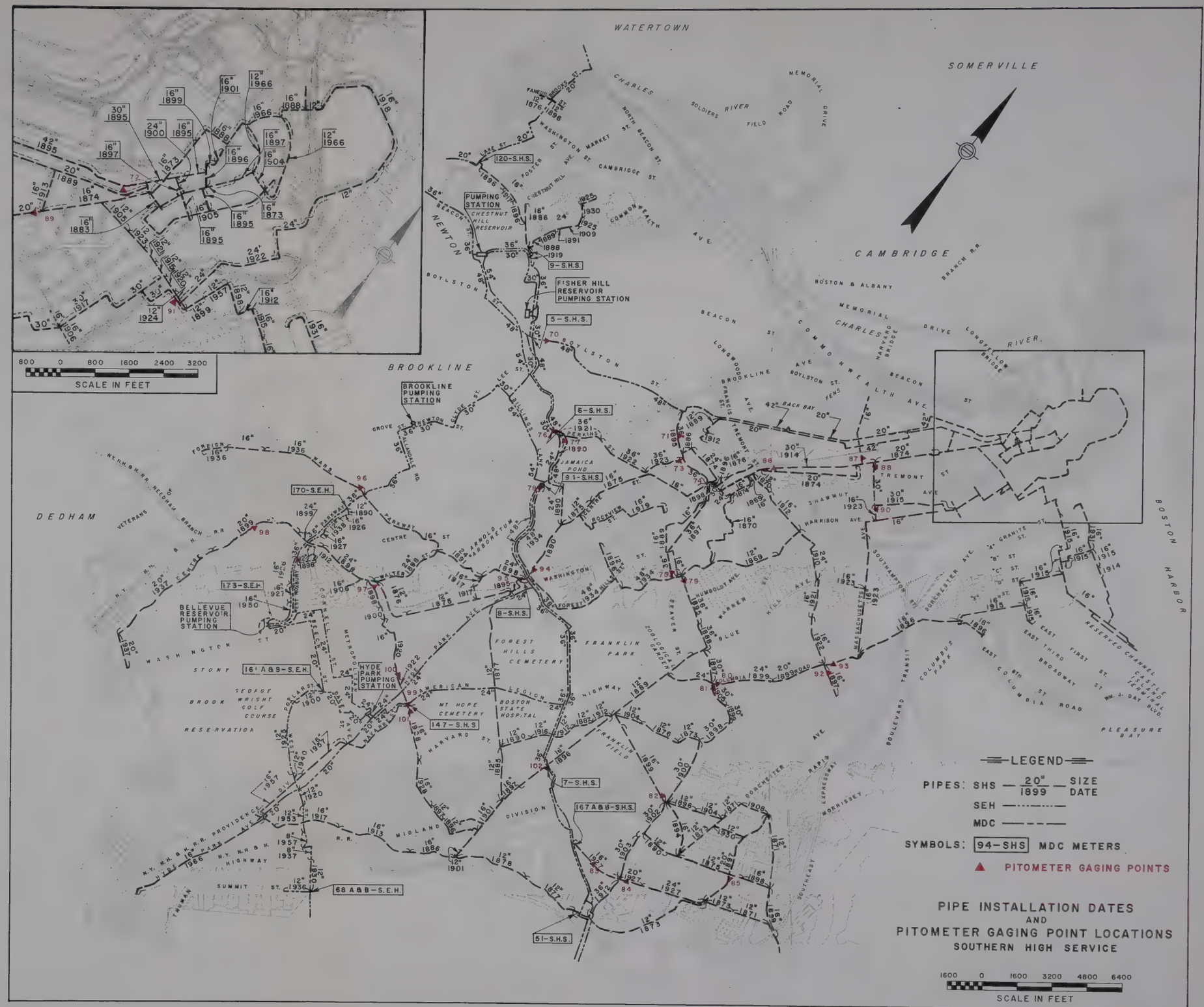
BOSTON WATER

FIGURE – DN2



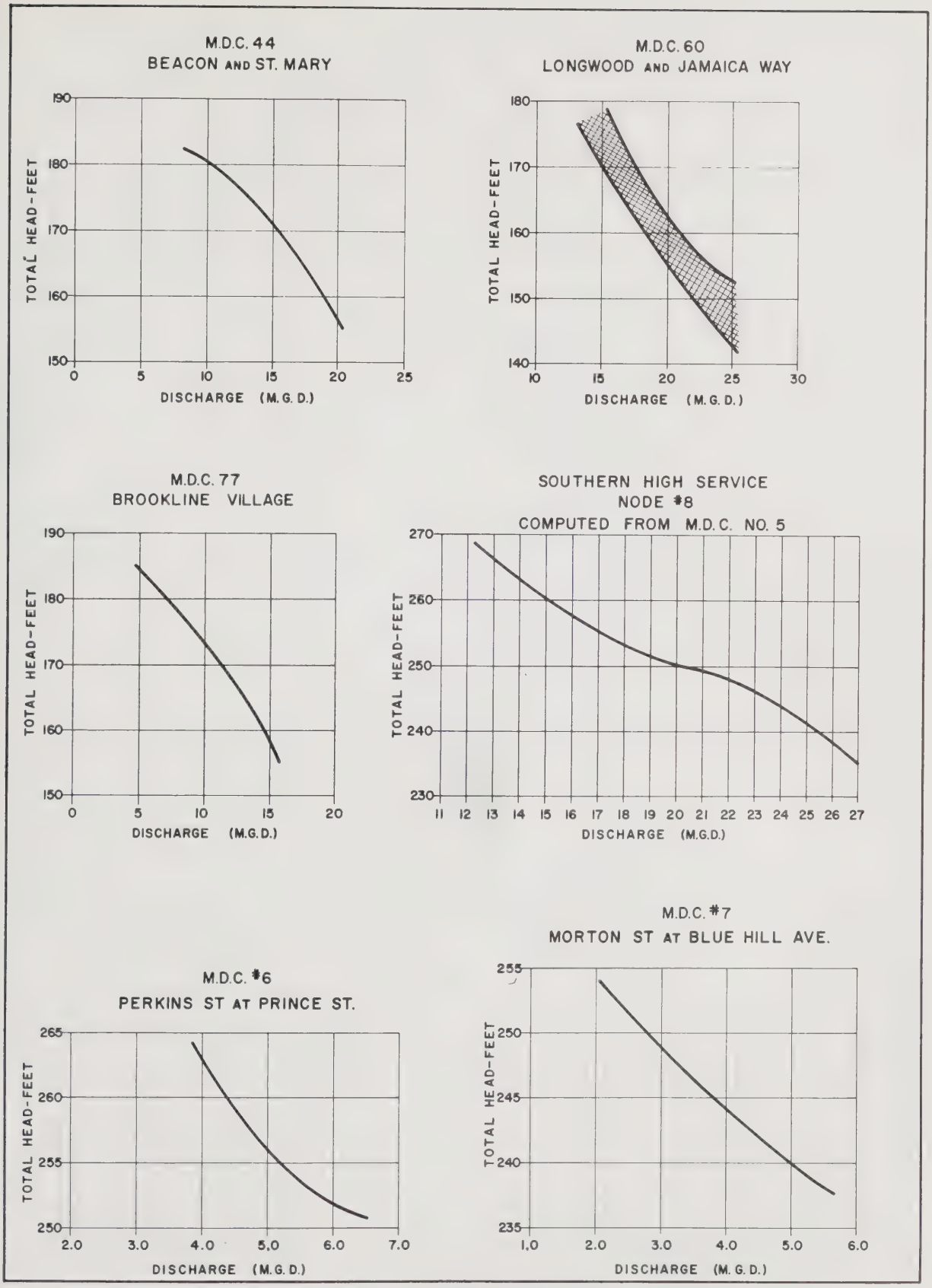
BOSTON WATER

FIGURE-DN 3



BOSTON WATER

FIGURE—DN4

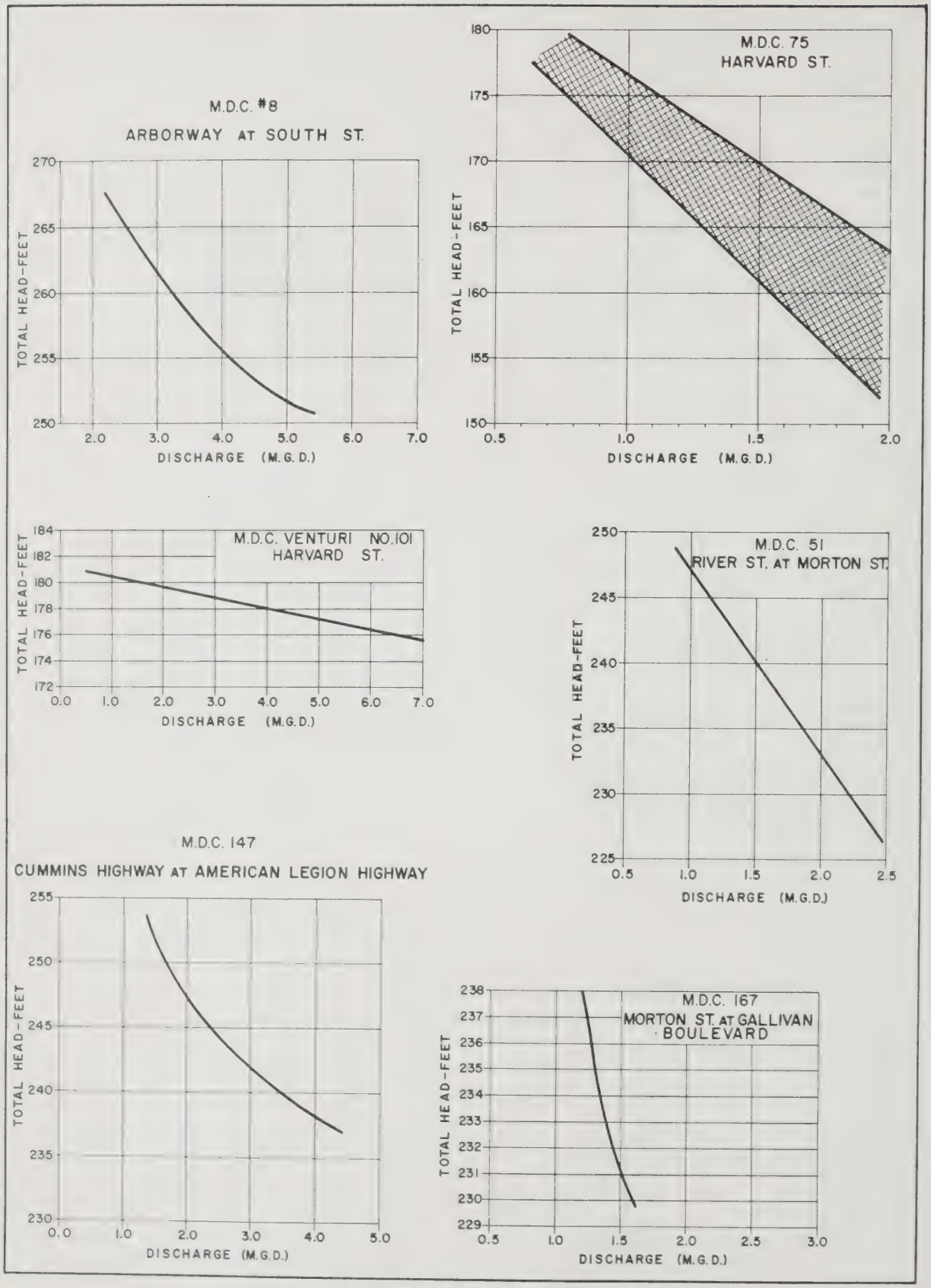


MDC VENTURI METERS

HEAD—DISCHARGE RATINGS, 1966

BOSTON WATER

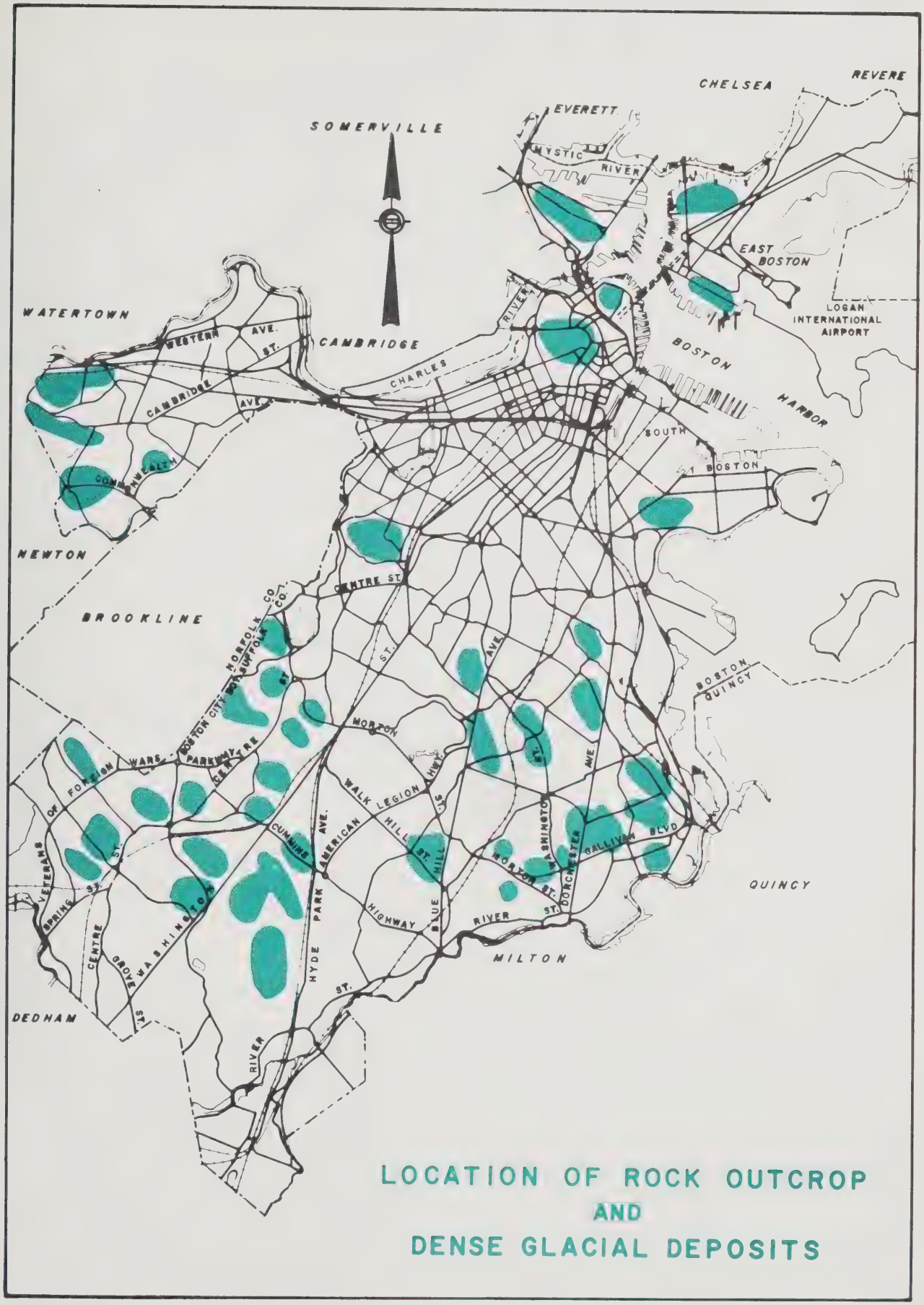
FIGURE—DN 5



MDC VENTURI METERS
HEAD–DISCHARGE RATINGS, 1966

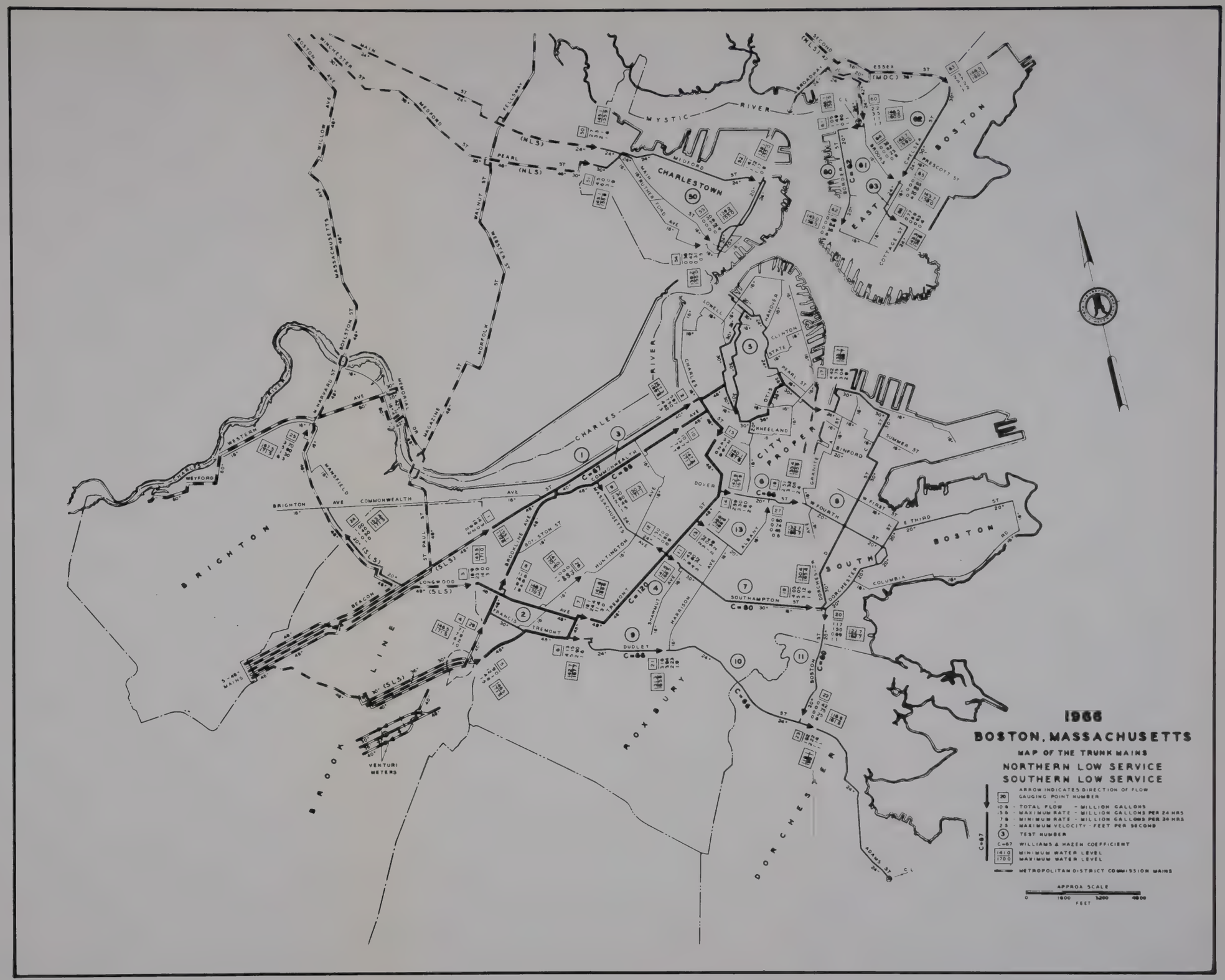
BOSTON WATER

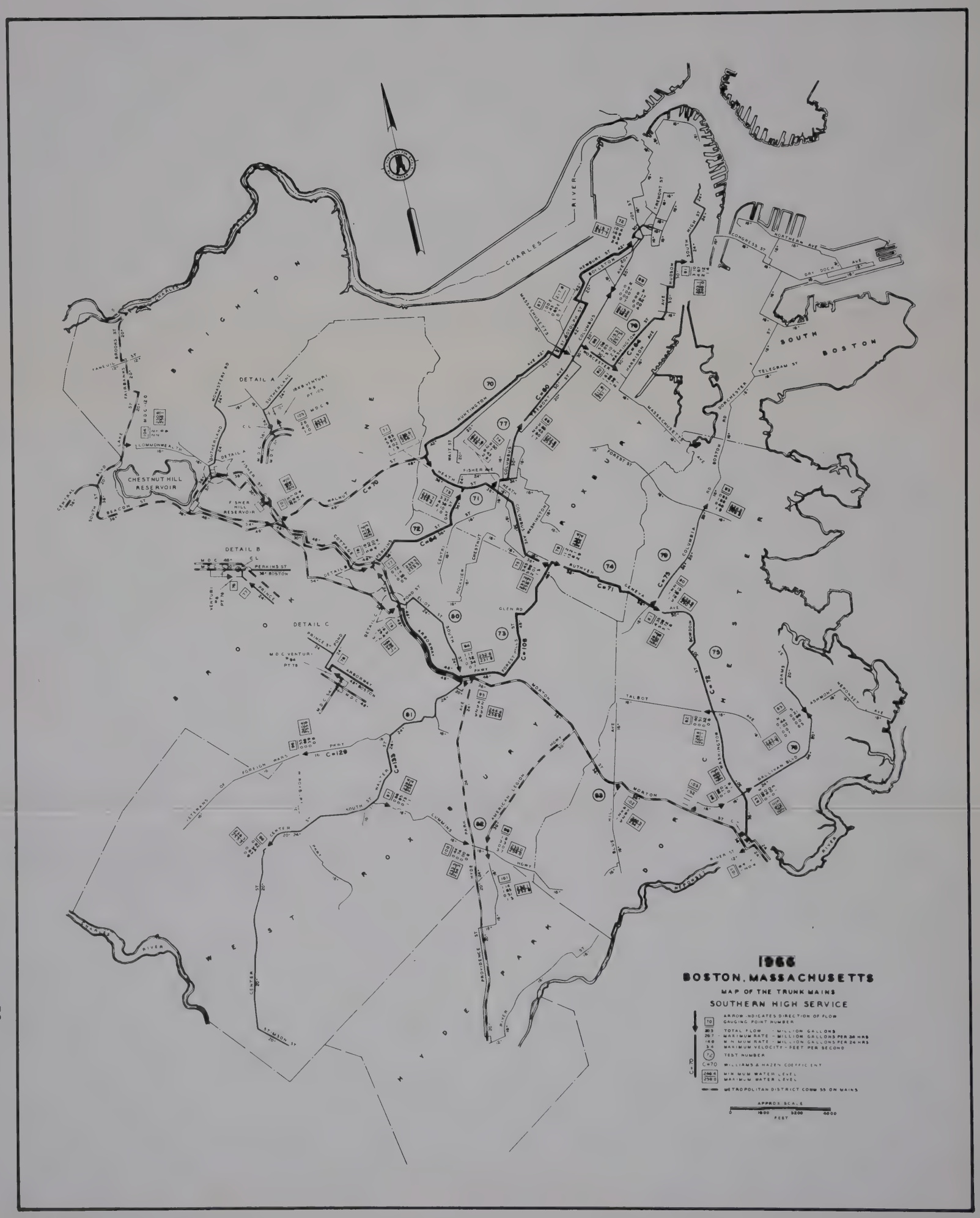
FIGURE — DN 6



BOSTON WATER

FIGURE—DN 7


1966
BOSTON, MASSACHUSETTS
MAP OF THE TRUNK MAINS
NORTHERN LOW SERVICE
SOUTHERN LOW SERVICE
ARROW INDICATES DIRECTION OF FLOW
GAUGING POINT NUMBER
TOTAL FLOW - MILLION GALLONS
MAXIMUM RATE - MILLION GALLONS PER 24 HRS
MINIMUM RATE - MILLION GALLONS PER 24 HRS
MAXIMUM VELOCITY - FEET PER SECOND
TEST NUMBER
WILLIAMS & HAZEN COEFFICIENT
MINIMUM WATER LEVEL
MAXIMUM WATER LEVEL
METROPOLITAN DISTRICT COMMISSION MAINS
APPROX SCALE
FEET
MYSTIC RIVER
CHARLES RIVER
CHARLESTOWN
EAST BOSTON
CITY PROPER
SOUTH BOSTON
BRIGHTON
BROOKLINE
ROXBURY
DORCHESTER
VENTURI METERS



BOSTON WATER

FIGURE-DN9

TABLE DN I

Pipe and Valves in the Distribution System, December 31, 1950

Diameter Inches	Length, Miles	Per Cent of Total	Increase Since January, 1936 Miles	Number of Gate Valves
4	11.69	1.2	1.99*	547
6	177.84	17.7	20.08*	3017
8	238.33	23.7	25.54	4608
10	85.02	8.5	0.86*	1577
12	349.76	34.8	21.92	5229
14	0.05		0.89*	14
16	69.43	6.9	10.50	768
20	20.47	2.0	4.06	71
24	16.91	1.7	1.09	75
30	14.36	1.4	2.80*	50
36	5.73	0.6	2.69*	31
40	1.82	0.2		5
42	3.07	0.3	0.04	4
48	10.53	1.0	2.69	26
Total	1005.01	100.0	36.53	16,112

*Decrease

From: National Board of Fire Underwriters Report, #158, City of Boston, 1951.

TABLE DN 2

PIPE INSTALLATION COSTS -- CITY OF BOSTON

Pipe Diameter (Inches)	Pipe Cost Dollars per Foot		Additional Cost for Installation Dollars per Foot	
	Cast Iron	Concrete	Highly Urbanized	Lightly Urbanized
8	4.00	---	27.40	11.85
10	5.00	---	30.65	13.45
12	6.40	---	33.95	15.80
14	8.25	---	36.65	17.10
16	10.00	7.20	39.55	19.10
18	11.50	---	42.30	21.85
20	13.00	9.25	44.75	22.75
24	15.00	11.75	50.55	24.70
30	18.25	16.00	52.40	26.60
36	24.20	20.50	54.45	30.15
42	30.80	25.50	59.65	33.75
48	37.00	31.00	64.35	37.40

TABLE DN 3

MAJOR MDC METERED CONNECTIONS

Meter Number	Service	Location	Diameter	Meter Throat
44	Low	Beacon Street at St. Mary's Street	48	18.00
60	Low	Riverway Drive at Longwood Avenue	48	22.50
75	Low	Harvard Street, Brookline Line	20	6.50
76	Low	Washington St. at Brookline Ave., Brookline	30	10.00
77	Low	Washington St. at Brookline Ave., Brookline	36	15.00
101	Low	No. Harvard St. at Spurr St., Allston	16	8.00
48	Low	Perkins Street, Somerville Line	30	10.00
78	Low	Broadway, Somerville Line	24	11.00
3	Low	Condor St. at Brooks St., East Boston	24	11.00
64	Low	Chelsea St. near Sewerage Station, East Boston	20	8.00
5	High	Boylston St. at Fisher Ave., Brookline	48	18.00
6	High	Perkins St. at Prince St., West Roxbury	30	12.00
7	High	Morton St. at Blue Hill Ave., Dorchester	16	8.00
8	High	Arborway at South Street, West Roxbury	20	8.00
51	High	River St. at Morton St., Dorchester	12	7.24
94	High	Arborway at Pond St., Jamaica Plain	36	15.00
147	High	Cummings Highway at American Legion Highway	16	8.00
9	High	Cleveland Circle, Brighton	16	8.00
120	High	Lake St. at Commonwealth Ave., Brighton	16	6.00
73	Extra High	Near Bellevue Reservoir, West Roxbury	16	5.25
170	Extra High	West Roxbury Pkwy. at Weld St., West Roxbury	12	6.773

Boston Water

CHAPTER SLS

SOUTHERN LOW SERVICE

ABSTRACT: A study of anticipated future water consumptions in South Boston indicates that the present SLS main capacity will not be adequate for future demands. If the trunk mains are rehabilitated, the SLS network will perform better under future loading conditions than the existing network performed in 1966. A recommended rehabilitation sequence for the SLS pipes allows shut-down for cleaning and cement-lining without major disturbances to other parts of the network. A recommendation for a new 36-inch pipe connecting Charlestown to Boston Proper is made.

Charles A. Maguire & Associates

Boston Hartford Providence

SOUTHERN LOW SERVICE

CONCLUSIONS

The following conclusions were made:

1. A considerable pressure variation occurs during the day in the Southern Low Service (SLS) because of high hydraulic losses in the MDC system and in the SLS itself.

2. The minimum pressure throughout the SLS occurred at 2:00 P.M. on the study day of 1966.

3. The maximum variation in pressure in the SLS occurs at Node 48 near Columbia Point in South Boston. This maximum variation was approximately 45 feet on the study day of 1966.

4. The maximum variation in pressure head may be reduced to approximately 20 feet by improvements to the MDC and Boston networks.

5. Rehabilitation of all trunk mains in the SLS by cleaning and cement-lining will provide adequate trunk main capacity for present and estimated future consumption patterns.

6. It is possible to plan a sequence for rehabilitation which will maintain adequate hydraulic capacity during periods of high demand, will insure that pressures throughout the SLS remain at least as high as minimums previously encountered and will avoid high velocities and flow reversals in unlined pipes.

7. If the recommended order of rehabilitation is followed, the cumulative cost shown in Table SLS71 will provide a reasonable estimate of the cost of rehabilitation at each stage.

8. Based on experience in other cities, it is likely that very few pipes will be found to be structurally unsound to the extent that cleaning and lining should not be attempted.

9. Preliminary studies show that a 36-inch pipe connecting the MDC inputs in Charlestown to the SLS in the vicinity of Node 41 in Boston Proper would provide additional flexibility in the operation of the SLS.

10. At periods of high demand, the new Charlestown trunk main would augment the water supply in needed areas of Boston Proper and South Boston.

11. In order to effectively utilize a new Charlestown trunk main, the major pipes connecting Boston Proper with South Boston must be rehabilitated and the existing Congress Street crossing of the Fort Point Channel enlarged.

12. The SLS provides adequate water for the high pressure fire service (HPFS) pumping stations in Boston Proper.

13. The pressure of the water supply from the SLS to the HPFS is not adequate for fire fighting without booster pumping.

14. The over-all capacity of the SLS network to deliver fire flows to South Boston can be maintained at the 1966 level throughout the program of rehabilitation if major changes in consumption do not occur.

RECOMMENDATIONS

1. The recommended sequence for rehabilitation is presented in Table SLS71. This sequence should be followed closely unless it can be shown by further studies that changes in the sequence will not restrict the capacity of the network to deliver emergency flows while major mains are shut down for rehabilitation.

2. If subsequent field inspections indicate that some pipes are structurally unsound, consideration should be given to replacing or lining them with a grouted steel liner of a slightly smaller diameter. This procedure will affect the over-all cost of the program and may affect the sequence of rehabilitation.

3. The present study should be periodically updated in the future if the program for rehabilitation extends over a significantly long period of time.

4. Trunk mains leading to South Boston should be rehabilitated as quickly as possible. Fortunately, within South Boston itself there are a number of trunk mains which carry small discharges and are presently redundant. These redundant mains may be rehabilitated early in the program.

5. The program for rehabilitation of trunk mains in South Boston should be coordinated with a program for improvement of the smaller distribution mains in the area. An adequate supply of water is available for fire fighting in South Boston but this supply can only be utilized at low pressures and a strong, smaller distribution grid is required for efficient fire fighting.

6. Following the rehabilitation of trunk mains leading to South Boston and North Dorchester, the emphasis in the rehabilitation program should be shifted to trunk mains leading to Boston Proper. These mains must be rehabilitated to provide necessary flexibility for temporary shut-down of major MDC supply lines for cleaning and lining.

7. Temporary connections between the Southern High Service (SHS) and the SLS should be provided when the 24-inch trunk mains in Roxbury and Dudley Streets between Shawmut Avenue and Tremont Street are rehabilitated.

8. Connection between the SHS and the SLS on Adams Street through pressure reducers will facilitate the rehabilitation of Pipe 22 in Adams Street. Division gates in this area should be relocated to supply as many users as possible via the SHS. This relocation of division gates along Adams Street should be considered as a permanent step for maintaining adequate supplies of water in this area.

9. A new 36-inch trunk main should be constructed to connect the MDC system near the Somerville-Charlestown border with the SLS in Boston Proper near Node 41.

10. The proposed new Charlestown trunk main should be interconnected with the Charlestown trunk main system in the vicinity of City Square, Charlestown.

11. Pipes which do not form integral parts of the SLS network and do not appear in Table SLS71 may be put out of service for cleaning and lining without adverse effects on other parts of the SLS. The rehabilitation of these prices may proceed independently of the plans for other portions of the network.

THE SOUTHERN LOW SERVICE

The Southern Low Service (SLS) provides water to areas in Boston Proper including the central business district, South Boston, North Dorchester, Brighton, and parts of Roxbury and West Roxbury, Figure DN2. Many areas serviced by the SLS are also provided with water from the Southern High Service (SHS).

The maximum pressure in the SLS is regulated by the MDC and does not normally exceed approximately 160 feet. A considerable pressure variation occurs throughout the SLS during the day because of hydraulic losses in the MDC system and in the SLS itself. Figure SLS1 shows the 24-hour cycle of pressures at selected points in the network and the corresponding 24-hour operation is contained in Tables SLS1 through SLS24 in Appendix SLS1.

Figure SLS1 indicates that at 2 PM, pressures are a minimum throughout the SLS, Figures SLS2 and SLS3 show total head and pressure head contours for this hour of the study day. These figures show that hydraulic losses to the downtown area are relatively minor compared to the losses between the principal MDC inputs at nodes 1, 3, and 4 and the most distant parts of South Boston. Evaluation of field data shows that these losses could be cut in half, approximately, by cleaning and cement-lining the principal trunk mains leading to South Boston.

A study of anticipated future water consumptions in South Boston indicated that the present main capacity will be inadequate to supply future demands, (Figure SLS4). Further analysis showed that if all of the trunk mains in the SLS were cleaned and cement-lined to provide additional hydraulic capacity, the network would be adequate to handle future flows in all areas except parts of North Dorchester, (Figure SLS5). These results suggested that further studies were necessary to determine the best sequence for cleaning and cement-lining pipes.

The principal objectives desired when planning the sequence for rehabilitation of existing trunk mains were:

1) To maintain adequate hydraulic capacity for periods of high demand.

2) To insure that pressures throughout the SLS were maintained at levels at least as high as the minimums previously encountered.

3) To minimize high velocities and flow reversals in unlined pipes which might contain appreciable quantities of sediment.

Subsequent studies showed that these objectives could be achieved throughout the proposed program for cleaning and lining. The following sections of this chapter discuss in some detail the most important features of the recommended sequence for rehabilitation of existing trunk mains in the SLS network.

RECOMMENDED REHABILITATION SEQUENCE

The following sections discuss specific aspects of the sequence for rehabilitation. It was assumed that the recommended sequence would be followed closely and alternative sequences were not investigated. If subsequent field conditions indicate a radical departure from the recommended sequence, an additional analysis should be implemented to determine the effects of such departure. Since only the 1966 level of demand was studied, the analysis should be periodically updated in the future if the program for rehabilitation extends for a significantly long period of time.

While the following discussions refer specifically to cleaning and cement-lining, it was assumed that prior to such rehabilitation, each individual pipe would be inspected in the field to determine structural soundness. Pipes found to be structurally unsound should be replaced rather than cleaned and lined. This replacement will affect the cost of the overall program for rehabilitation and may affect the sequence of rehabilitation.

South Boston: The SLS supplies South Boston through trunk mains in Dudley Street, Southampton Street, Dover Street, and Congress Street, Figure SLS5. Most of the losses between the MDC inputs and South Boston occur in these four major trunk mains. It would be most desirable to rehabilitate these mains as quickly as possible. The program for rehabilitation of the SLS should therefore be directed initially towards providing enough flexibility to allow these mains to be temporarily taken out of service for cleaning and cement-lining. Fortunately, within South Boston itself there are a number of trunk mains which are capable of carrying much more water than presently called for. Effective utilization of these mains will provide the necessary flexibility to allow cleaning and lining or replacement of the four essential trunk main lines to South Boston.

Careful study of Tables SLS27 through SLS70 showed that the rehabilitation program for South Boston can be effectively carried out without any noticeable decrease in pressures to consumers on the Southern Low Service in South Boston. The order of improvements studied in Tables SLS27 through SLS70 was altered slightly to avoid flow reversals in previously unlined pipes. Table SLS71 shows the recommended order of improvements to pipes in the Southern Low Service. Major flow reversals are not anticipated and higher than normal velocities should be confined to those pipes which have just previously been cleaned and lined. The overall capacity of the SLS network to deliver fire-flows to South Boston will be maintained at the 1966 level throughout the program of rehabilitation if major changes in consumption do not occur.

North Dorchester: The portion of North Dorchester supplied by the SLS depends principally on the trunk mains in Dudley Street and Boston Street for water. When the time comes to rehabilitate the 24-inch trunk mains in Roxbury and Dudley Streets between Shawmut Avenue and Tremont Street, there will be a noticeable decrease in pressures to users all along Dudley Street from Shawmut Avenue (Node 15) to the end of Adams Street (Node 53). When this section of pipe is temporarily out of service (Pipe 18), it would be advisable to supply as many users as possible in North Dorchester via the Southern High Service. If this is not done, pressures near the intersection of Shawmut Avenue and Dudley Street may drop as much as 10 PSI below normal, while at the extreme end of the SLS on Adams Street in North Dorchester, a 5 or 6 PSI decrease in pressures may be noticeable at the peak hours of the day. These noticeable pressure decreases indicate a decreased capacity to supply emergency demands, and should be avoided. Studies of the behavior of the SLS in the year 2020 showed that it would be most desirable to supply as much of North Dorchester as possible by the SHS. The re-location of division gates along Adams Street should be considered as a permanent step in maintaining adequate supplies to this area.

Boston Proper and the MDC Supply Lines: The operation of the SLS in the year 2020, as shown on Figure SLS5, should be satisfactory if all major pipes are cleaned and lined within Boston and if the MDC is able to maintain a reasonably constant pressure at the Boston line throughout the day. Since the MDC supply lines are presently in need of rehabilitation, it is necessary that the Boston trunk main system be provided with sufficient flexibility to allow temporary shut-down of MDC lines for cleaning and cement-lining. Following the rehabilitation of the trunk mains leading to South Boston and North Dorchester, the emphasis should then shift to Boston Proper in order to provide this flexibility.

With the principal trunk mains in Boston rehabilitated, the MDC pipes can be temporarily put out of service one by one for cleaning and lining without adverse effects in Boston.

COST OF IMPROVEMENTS TO THE SOUTHERN LOW SERVICE

The need for field investigations to determine the structural soundness of existing pipes was discussed in Chapter DN. It is expected that very few of the trunk mains will have to be replaced. In those cases for which field inspections indicate that replacement is necessary it may be desirable to clean and line as a temporary measure while construction of new pipe proceeds. Table SLS71 shows the approximate cumulative cost of rehabilitation at each stage in the recommended sequence of rehabilitation. Approximate costs for replacement of each pipe, based on current prices (1967), are also shown. It is anticipated that unit prices will increase in the future so that the sooner

this program is implemented, the less expensive the total cost of rehabilitation will be. (From a hydraulic point of view, it would be desirable to implement the rehabilitation program as early as possible to avoid the rising levels of consumption predicted in Chapter WSU.)

Based on experience gained in other cities, it is likely that very few pipes will be found to be structurally unsound to the extent that cleaning and lining should not be attempted. If the recommended order of rehabilitation, Table SLS71, is followed, the cumulative cost shown in the table should provide a reasonable estimate of the cost of rehabilitation at each stage.

CHANGES IN RECOMMENDED REHABILITATION SEQUENCE

For the purpose of awarding contracts for cement-lining and cleaning, it would be desirable to partition the SLS into areas. It should be emphasized, however, that the present study was made to determine the sequence for rehabilitation which would allow the pattern of water consumption in the City to continue as normal while major mains were out of service. The recommended order should be followed unless it can be shown by further studies that modifications will not endanger the water supply while major mains are shut down for rehabilitation.

Examination of Table SLS71 will show that several trunk mains which are not integral parts of the SLS network do not appear in the Table. For example, Pipe No. 70 on Northern Avenue in South Boston and Pipe No. 22 on Pleasant Street in North Dorchester are not in the recommended sequence for rehabilitation. These pipes may be put out of service for cleaning and lining without adverse affects on other parts of the SLS. The timing for rehabilitation of these exterior lines may be determined independently of the timing of other portions of the network.

CHANGES IN SLS DIVISION GATE LOCATIONS

The area of North Dorchester which is presently served by the SLS is at the furthest extremity of the network (Figure SLS1). At some time in the future when the projected water requirements for this area are met, the existing configuration of the SLS will be unable to maintain adequate pressures near Node 53. This area may be conveniently serviced by inputs from the SHS. The additional consumption in this area would have little or no effect on the improved SHS, while the consumers in North Dorchester would notice a marked improvement in pressure conditions at peak hours of the day. A connection

between the SHS and the SLS through pressure reducers in the vicinity of Node 53 is therefore recommended. This connection will facilitate the rehabilitation of pipe 22.

NEW CHARLESTOWN TRUNK MAIN

Recent improvements in the MDC supply to the Northern Low Service in Charlestown present the possibility of constructing a new trunk main to supply the SLS from the MDC inputs near the Charlestown-Somerville border. The main purpose of this new trunk main would be to provide additional flexibility to the network during the rehabilitation operations and to supplement the 40" pipe in Beacon Street (installed in 1852) if field inspections indicate a need for future replacement. Preliminary studies show that a 36" pipe connecting the MDC inputs near the Charlestown-Somerville border to the SLS in the vicinity of Node 41 in Boston Proper would provide the desired flexibility, (Tables SLS86 to SLS90).

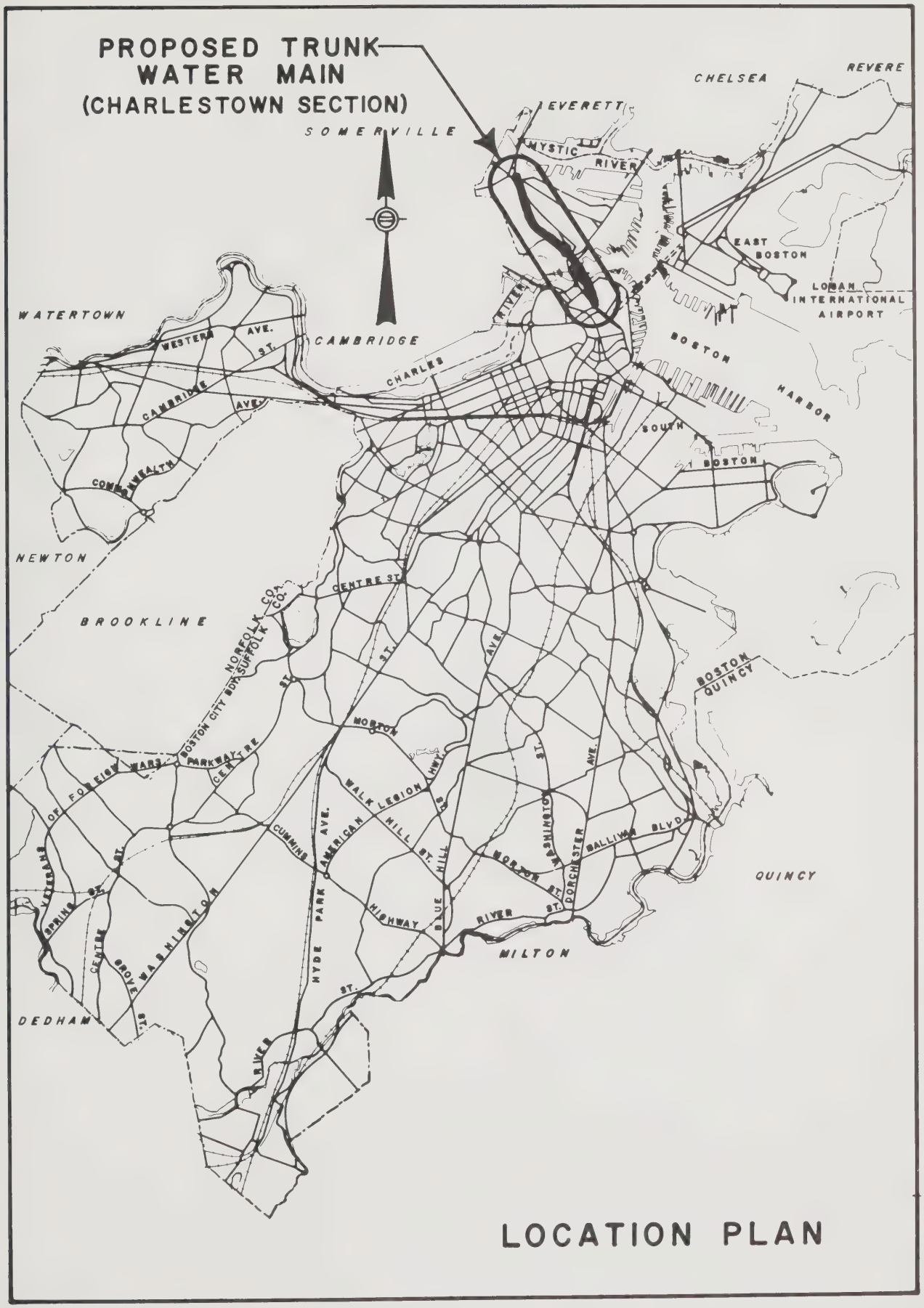
In order to provide additional trunk main capacity in Charlestown it would be desirable to connect the existing Charlestown trunk grid near Harvard Square to the new main. With the rehabilitation of existing large diameter mains in Boston Proper and South Boston and the enlargement of the existing Congress Street crossing of the Fort Point Channel, the new main would provide a strong alternative source of supply for Charlestown, Boston Proper, and South Boston.

FIRE FIGHTING CAPACITY

Tables SLS91 and SLS97 present the results of network analysis for fire flow conditions at Node 29 near the suction for the HPFS pumping stations and near Node 45, a weak area in South Boston. These studies show that the high pressure fire service pumps could receive up to 31,000 GPM from the SLS during the peak hour of 1966. In the year 2020 with the major mains and the network rehabilitated the HPFS would have access to 40,000 GPM from the SLS. With proper interconnection to the SLS the HPFS could deliver these discharges at approximately 40 PSI without the use of the HPFS pumping stations. This pressure would be slightly too low for effective fire fighting. It is seen that the SLS provides an adequate suction supply for pumping stations in the central business district.

As shown by Tables SLS95 to SLS97 an adequate supply of water is available for fire fighting in South Boston. This supply can only be utilized by mobile pumping units as the pressures during emergency conditions become very low. The importance of an early program of cleaning and cement-lining of mains leading to South Boston is indicated. This program should be coupled with a program for rehabilitation of smaller pipes in the South Boston area.

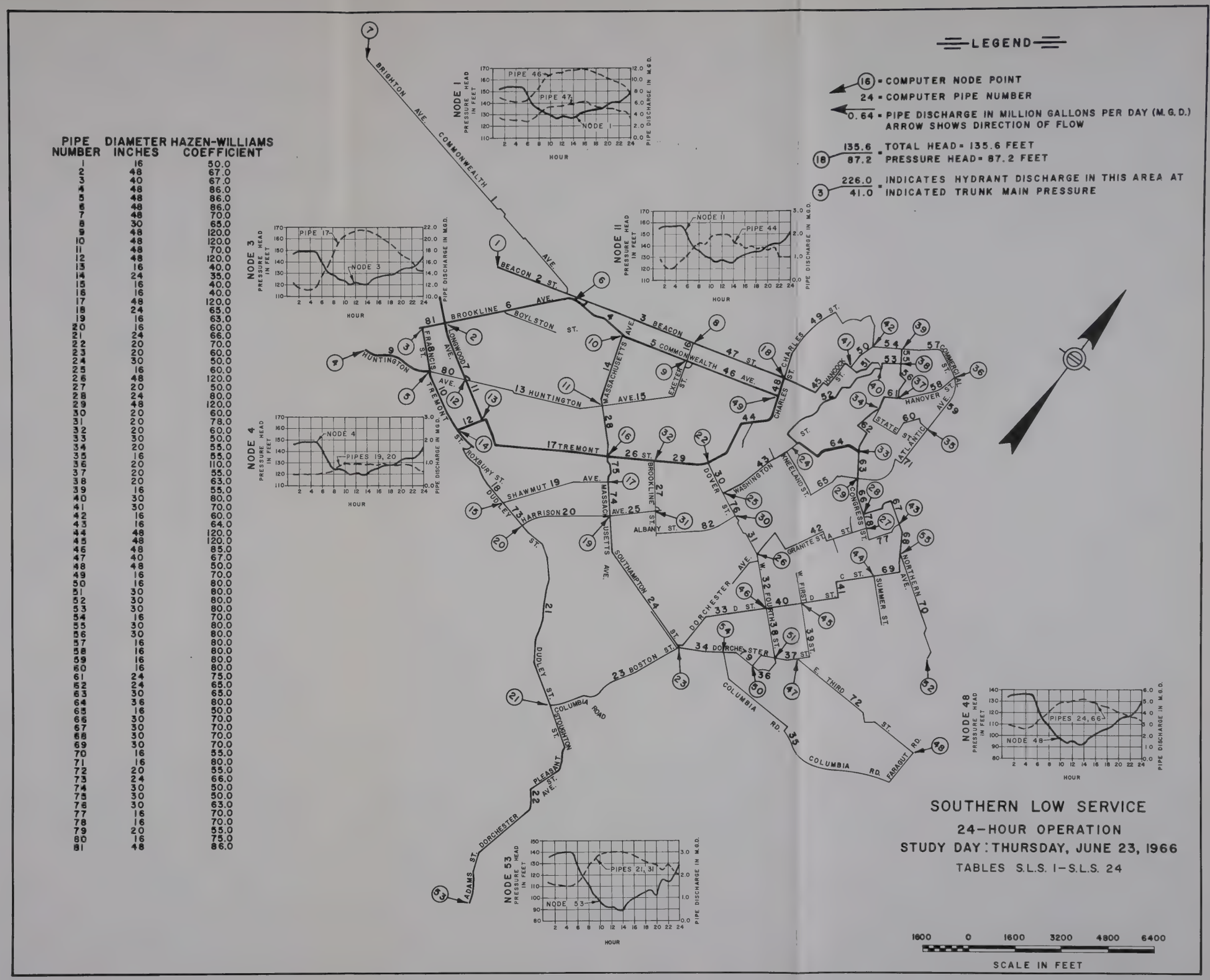
The water supply to South Boston will be strengthened by the addition of the new trunk main leading from Charlestown to Boston Proper and the use of pressure reducers to obtain supply from the SHS in North Dorchester.



LOCATION PLAN

BOSTON WATER

PIPE NUMBER	DIAMETER INCHES	HAZEN-WILLIAMS COEFFICIENT
1	16	50.0
2	48	67.0
3	40	67.0
4	48	86.0
5	48	86.0
6	48	86.0
7	48	70.0
8	30	65.0
9	48	120.0
10	48	120.0
11	48	70.0
12	48	120.0
13	16	40.0
14	24	35.0
15	16	40.0
16	16	40.0
17	48	120.0
18	24	65.0
19	16	63.0
20	16	60.0
21	24	66.0
22	20	70.0
23	20	60.0
24	30	50.0
25	16	60.0
26	48	120.0
27	20	50.0
28	24	80.0
29	48	120.0
30	20	60.0
31	20	78.0
32	20	60.0
33	30	50.0
34	20	55.0
35	16	55.0
36	20	110.0
37	20	55.0
38	20	63.0
39	16	55.0
40	30	80.0
41	30	70.0
42	16	60.0
43	16	64.0
44	48	120.0
45	48	120.0
46	48	85.0
47	40	67.0
48	48	50.0
49	16	70.0
50	16	80.0
51	30	80.0
52	30	80.0
53	30	80.0
54	16	70.0
55	30	80.0
56	30	80.0
57	16	80.0
58	16	80.0
59	16	80.0
60	16	80.0
61	24	75.0
62	24	65.0
63	30	65.0
64	36	80.0
65	16	50.0
66	30	70.0
67	30	70.0
68	30	70.0
69	30	70.0
70	16	55.0
71	16	80.0
72	20	55.0
73	24	66.0
74	30	50.0
75	30	50.0
76	30	63.0
77	16	70.0
78	16	70.0
79	20	55.0
80	16	75.0
81	48	86.0



SOUTHERN LOW SERVICE

24-HOUR OPERATION

STUDY DAY: THURSDAY, JUNE 23, 1966

TABLES S.L.S. 1-S.L.S. 24

FIGURE-SLS 1

PIPE NUMBER	DIAMETER INCHES	HAZEN-WILLIAMS COEFFICIENT	PIPE DISCHARGE IN MGD
1	16	50.0	0.4
2	48	67.0	18.5
3	40	67.0	8.2
4	48	86.0	17.6
5	48	86.0	15.3
6	48	86.0	12.5
7	48	70.0	14.4
8	30	65.0	4.0
9	48	120.0	14.0
10	48	120.0	16.7
11	48	70.0	12.2
12	48	120.0	11.6
13	16	40.0	0.5
14	24	35.0	1.2
15	16	40.0	0.2
16	16	40.0	0.3
17	48	120.0	21.9
18	24	65.0	4.3
19	16	63.0	0.9
20	16	60.0	1.0
21	24	66.0	3.0
22	20	70.0	2.0
23	20	60.0	1.11
24	30	50.0	5.0
25	16	60.0	0.1
26	48	120.0	11.6
27	20	50.0	1.8
28	24	80.0	0.3
29	48	120.0	8.3
30	20	60.0	3.9
31	20	78.0	3.0
32	20	60.0	1.7
33	30	50.0	1.1
34	20	55.0	1.5
35	16	55.0	0.4
36	20	110.0	0.7
37	20	55.0	0.9
38	20	63.0	1.5
39	16	55.0	0.7
40	30	80.0	0.7
41	30	70.0	0.6
42	16	60.0	0.1
43	16	64.0	0.8
44	48	120.0	1.7
45	48	120.0	13.9
46	48	85.0	11.8
47	40	67.0	5.8
48	48	50.0	10.4
49	16	70.0	0.7
50	16	80.0	1.8
51	30	80.0	11.2
52	30	80.0	4.0
53	30	80.0	5.7
54	16	70.0	1.7
55	30	80.0	0.1
56	30	80.0	4.8
57	16	80.0	0.9
58	16	80.0	0.6
59	16	80.0	0.7
60	16	80.0	0.6
61	24	75.0	3.0
62	24	65.0	1.5
63	30	65.0	4.3
64	36	80.0	4.1
65	16	50.0	0.4
66	30	70.0	4.9
67	30	70.0	3.7
68	30	70.0	4.0
69	30	70.0	2.6
70	16	55.0	1.0
71	16	80.0	0.4
72	20	55.0	0.9
73	24	66.0	3.9
74	30	50.0	6.6
75	30	50.0	8.5
76	30	63.0	2.6
77	16	70.0	0.7
78	16	70.0	0.8
79	20	55.0	0.4
80	16	75.0	0.3
81	48	86.0	1.6
82	16	70.0	1.1

SOUTHERN LOW SERVICE

STUDY DAY: THURSDAY, JUNE 23, 1966

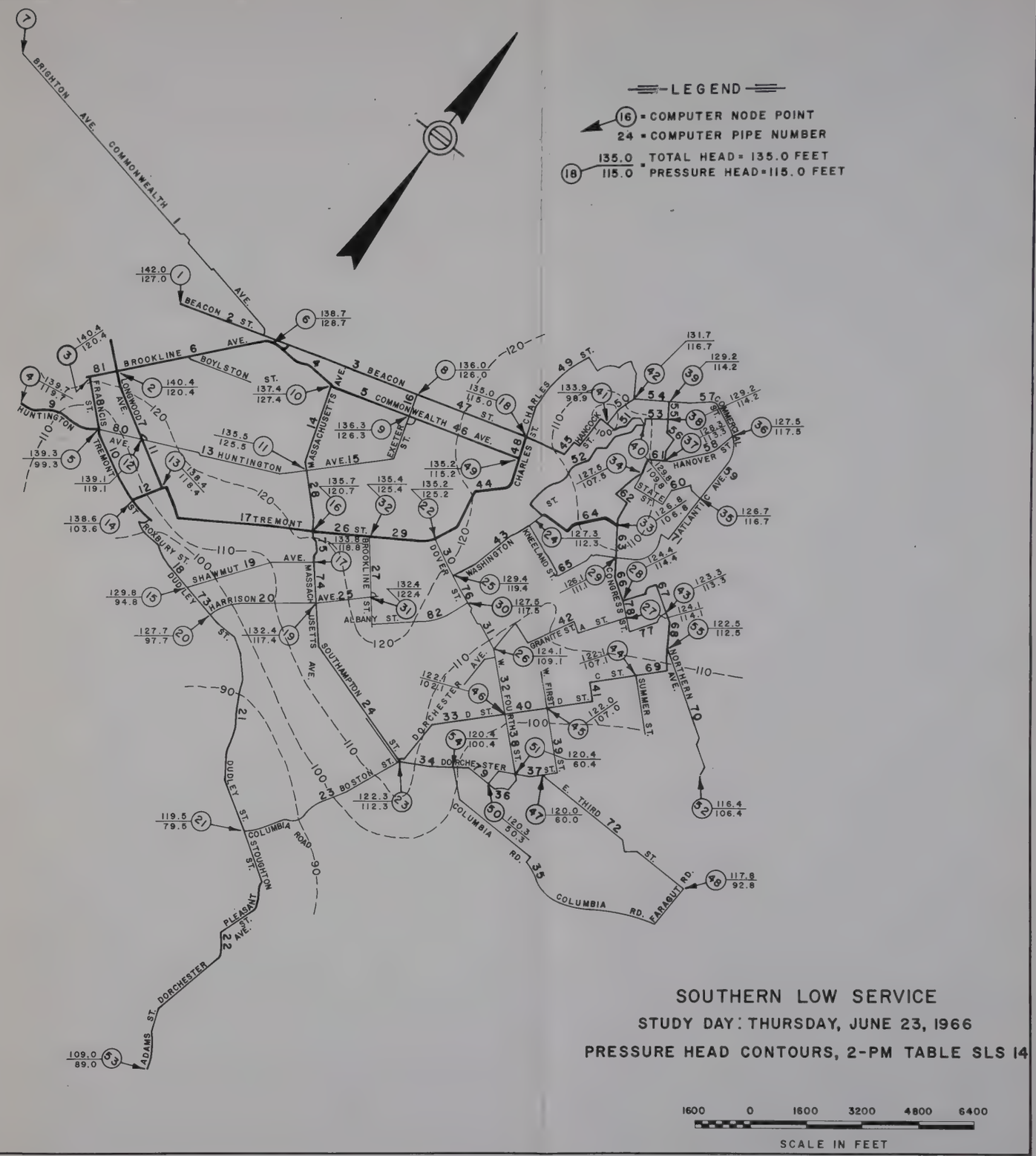
TOTAL HEAD CONTOURS, 2-PM TABLE SLS 14

1600 0 1600 3200 4800 6400

SCALE IN FEET

FIGURE-SLS 2

PIPE NUMBER	DIAMETER INCHES	HAZEN-WILLIAMS COEFFICIENT	PIPE DISCHARGE IN MGD
1	16	50.0	0.4
2	48	67.0	18.5
3	40	67.0	8.2
4	48	86.0	17.6
5	48	86.0	15.3
6	48	86.0	12.5
7	48	70.0	14.4
8	30	65.0	4.0
9	48	120.0	14.0
10	48	120.0	16.7
11	48	70.0	12.2
12	48	120.0	11.6
13	16	40.0	0.5
14	24	35.0	1.2
15	16	40.0	0.2
16	16	40.0	0.3
17	48	120.0	21.9
18	24	65.0	4.3
19	16	63.0	0.9
20	16	60.0	1.0
21	24	66.0	3.0
22	20	70.0	2.0
23	20	60.0	1.11
24	30	50.0	5.0
25	16	60.0	0.1
26	48	120.0	11.6
27	20	50.0	1.8
28	24	80.0	0.3
29	48	120.0	8.3
30	20	60.0	3.9
31	20	78.0	3.0
32	20	60.0	1.7
33	30	50.0	1.1
34	20	55.0	1.5
35	16	55.0	0.4
36	20	110.0	0.7
37	20	55.0	0.9
38	20	63.0	1.5
39	16	55.0	0.7
40	30	80.0	0.7
41	30	70.0	0.6
42	16	60.0	0.1
43	16	64.0	0.8
44	48	120.0	1.7
45	48	120.0	13.9
46	48	85.0	11.8
47	40	67.0	5.8
48	48	50.0	10.4
49	16	70.0	0.7
50	16	80.0	1.8
51	30	80.0	11.2
52	30	80.0	4.0
53	30	80.0	5.7
54	16	70.0	1.7
55	30	80.0	0.1
56	30	80.0	4.8
57	16	80.0	0.9
58	16	80.0	0.6
59	16	80.0	0.7
60	16	80.0	0.6
61	24	75.0	3.0
62	24	65.0	1.5
63	30	65.0	4.3
64	36	80.0	4.1
65	16	50.0	0.4
66	30	70.0	4.9
67	30	70.0	3.7
68	30	70.0	4.0
69	30	70.0	2.6
70	16	55.0	1.0
71	16	80.0	0.4
72	20	55.0	0.9
73	24	66.0	3.9
74	30	50.0	6.6
75	30	50.0	8.5
76	30	63.0	2.6
77	16	70.0	0.7
78	16	70.0	0.8
79	20	55.0	0.4
80	16	75.0	0.3
81	48	86.0	1.6
82	16	70.0	1.1



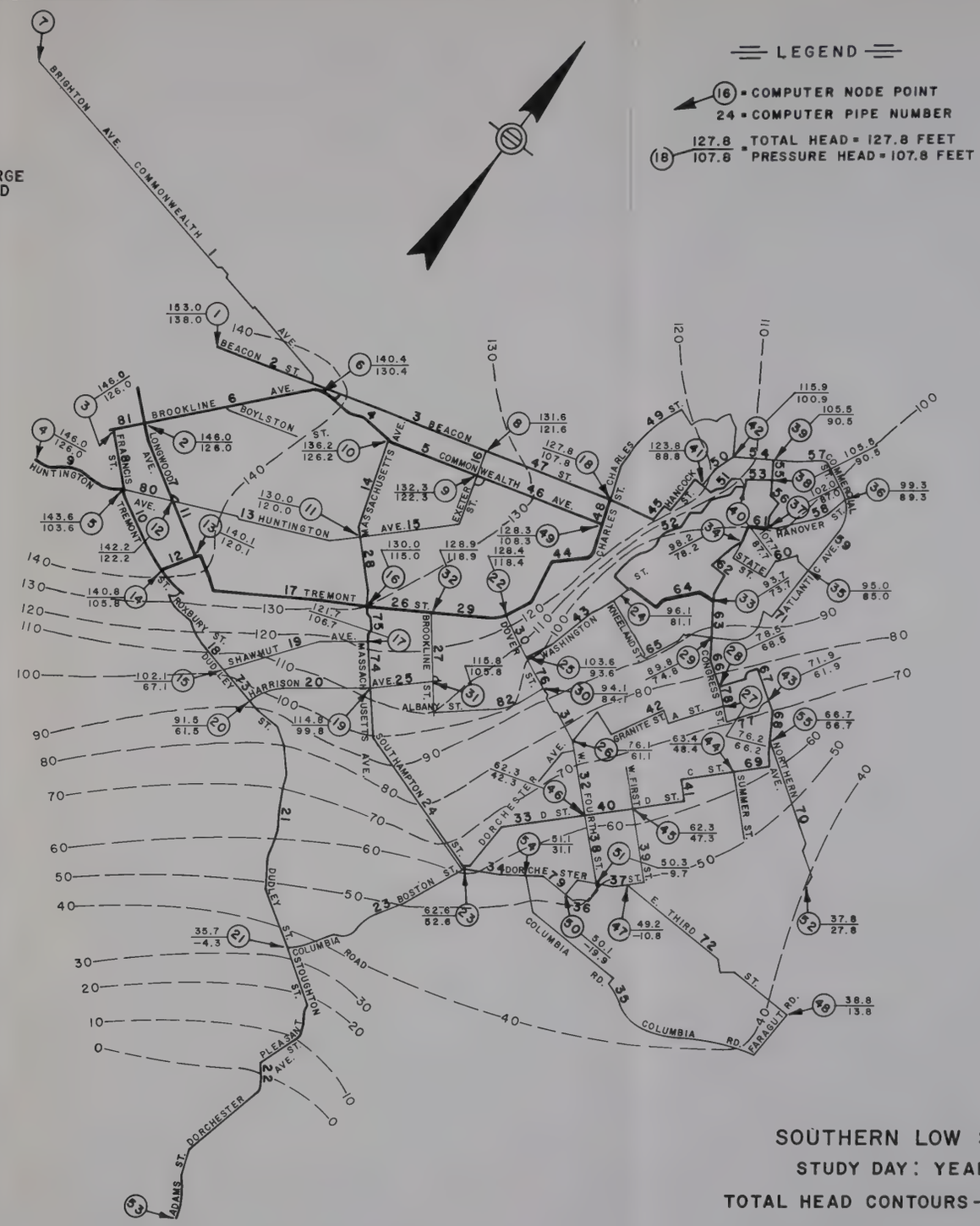
SOUTHERN LOW SERVICE
STUDY DAY: THURSDAY, JUNE 23, 1966
PRESSURE HEAD CONTOURS, 2-PM TABLE SLS 14

1600 0 1600 3200 4800 6400
SCALE IN FEET

BOSTON WATER

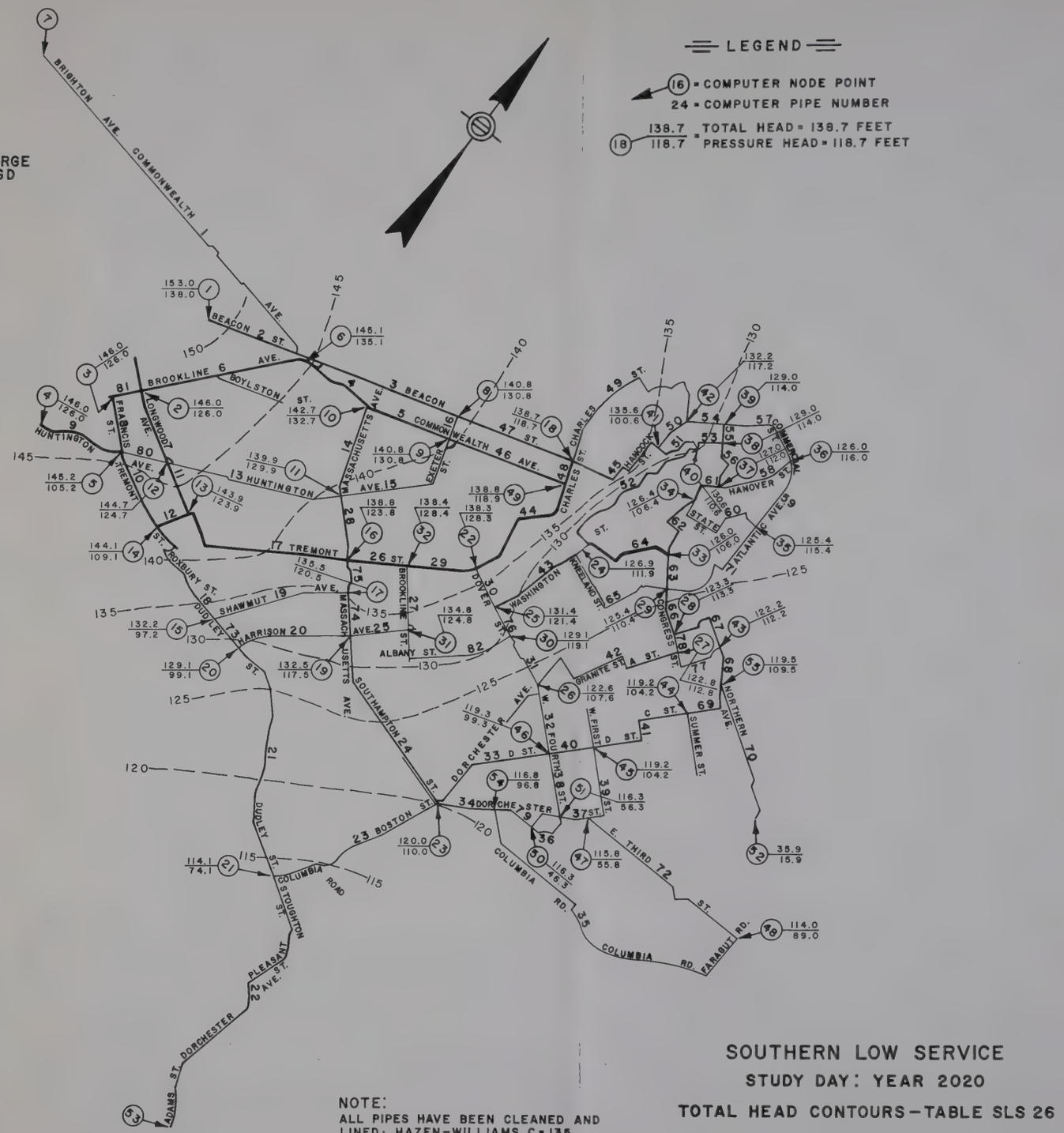
FIGURE-SLS3

PIPE NUMBER	DIAMETER INCHES	HAZEN-WILLIAMS COEFFICIENT	DISCHARGE IN MGD
1	16	50.0	2.0
2	48	67.0	38.0
3	40	67.0	16.0
4	48	86.0	34.0
5	48	86.0	29.7
6	48	86.0	23.3
7	48	70.0	25.7
8	30	65.0	6.0
9	48	120.0	33.5
10	48	120.0	36.4
11	48	70.0	22.2
12	48	120.0	25.4
13	16	40.0	1.0
14	24	35.0	2.3
15	16	40.0	0.4
16	16	40.0	0.6
17	48	120.0	44.1
18	24	65.0	9.6
19	16	63.0	2.2
20	16	60.0	2.5
21	24	66.0	8.5
22	20	70.0	6.0
23	20	60.0	4.0
24	30	50.0	12.4
25	16	60.0	0.5
26	48	120.0	22.4
27	20	50.0	4.0
28	24	80.0	0.2
29	48	120.0	15.7
30	20	60.0	8.5
31	20	78.0	7.4
32	20	60.0	4.7
33	30	50.0	1.3
34	20	55.0	4.0
35	16	55.0	0.1
36	20	110.0	1.0
37	20	55.0	1.6
38	20	63.0	4.4
39	16	55.0	2.0
40	30	80.0	0.1
41	30	70.0	3.2
42	16	60.0	0.2
43	16	64.0	1.6
44	48	120.0	2.5
45	48	120.0	28.3
46	48	85.0	24.0
47	40	67.0	12.0
48	48	50.0	21.0
49	16	70.0	1.5
50	16	80.0	3.6
51	30	80.0	23.3
52	30	80.0	9.4
53	30	80.0	11.4
54	16	70.0	3.6
55	30	80.0	0.4
56	30	80.0	10.2
57	16	80.0	2.0
58	16	80.0	1.3
59	16	80.0	1.7
60	16	80.0	1.2
61	24	75.0	7.0
62	24	65.0	4.2
63	30	65.0	11.3
64	36	80.0	9.5
65	16	50.0	1.0
66	30	70.0	13.3
67	30	70.0	10.1
68	30	70.0	11.1
69	30	70.0	7.6
70	16	55.0	2.4
71	16	80.0	1.5
72	20	55.0	2.0
73	24	66.0	9.5
74	30	50.0	15.3
75	30	50.0	19.1
76	30	63.0	6.1
77	16	70.0	1.7
78	16	70.0	2.4
79	20	55.0	1.3
80	16	75.0	1.1
81	48	86.0	0.0
82	16	70.0	2.5



FIGURE—SLS 4

PIPE NUMBER	DIAMETER INCHES	HAZEN-WILLIAMS COEFFICIENT	DISCHARGE IN MGD
1	16	50.0	2.0
2	48	67.0	59.3
3	40	67.0	22.0
4	48	86.0	39.4
5	48	86.0	32.0
6	48	86.0	13.4
7	48	70.0	28.5
8	30	65.0	6.7
9	48	120.0	18.3
10	48	120.0	22.4
11	48	70.0	23.6
12	48	120.0	10.5
13	16	40.0	1.8
14	24	35.0	5.6
15	16	40.0	1.0
16	16	40.0	0.2
17	48	120.0	30.7
18	24	65.0	10.5
19	16	63.0	1.8
20	16	60.0	2.0
21	24	66.0	8.6
22	20	70.0	6.0
23	20	60.0	3.7
24	30	50.0	15.5
25	16	60.0	2.1
26	48	120.0	13.0
27	20	50.0	5.3
28	24	80.0	4.5
29	48	120.0	5.0
30	20	60.0	9.6
31	20	78.0	7.3
32	20	60.0	4.8
33	30	50.0	3.5
34	20	55.0	4.8
35	16	55.0	1.0
36	20	110.0	0.2
37	20	55.0	2.5
38	20	63.0	4.5
39	16	55.0	1.0
40	30	80.0	2.4
41	30	70.0	0.1
42	16	60.0	0.4
43	16	64.0	2.6
44	48	120.0	9.3
45	48	120.0	24.6
46	48	85.0	26.1
47	40	67.0	17.0
48	48	50.0	11.5
49	16	70.0	1.1
50	16	80.0	2.3
51	30	80.0	21.0
52	30	80.0	8.6
53	30	80.0	9.8
54	16	70.0	2.0
55	30	80.0	0.7
56	30	80.0	7.5
57	16	80.0	1.3
58	16	80.0	0.7
59	16	80.0	0.6
60	16	80.0	1.1
61	24	75.0	4.7
62	24	65.0	2.2
63	30	65.0	9.2
64	36	80.0	9.4
65	16	50.0	1.3
66	30	70.0	10.2
67	30	70.0	7.4
68	30	70.0	7.7
69	30	70.0	4.3
70	16	55.0	2.4
71	16	80.0	0.2
72	20	55.0	1.9
73	24	66.0	10.1
74	30	50.0	16.3
75	30	50.0	19.8
76	30	63.0	6.6
77	16	70.0	1.1
78	16	70.0	2.0
79	20	55.0	2.2
80	16	75.0	0.7
81	48	86.0	0.00
82	16	70.0	2.4



FIGURE—SLS 5

TABLE SLS-71

SOUTHERN LOW SERVICE

RECOMMENDED ORDER OF IMPROVEMENTS

No.	Pipe No.	Diameter	Length (Feet)	Street Location	Cost in Thousand Dollars (1967) Cleaning & Lining	Cumulative Cleaning & Lining	Valves & Fittings	Replacement Cast Iron	Replacement Concrete
1	40	30	1280	D Street	12.8	12.8	6.0	57.4	54.6
2	25	16	3900	Harrison Ave.	39.0	51.8	3.5	113.0	103.0
3	33	30	4800	D Street	48.0	99.8	18.0	215.0	205.0
4	42	16	3200	Granite St.	32.0	131.8	10.4	93.1	84.2
5	41	30	2720	D, C Streets	27.2	159.0	3.0	122.0	116.0
6	32	20	1760	W. 4th St.	17.6	176.6	4.0	62.9	56.3
7	31	20	1600	Dover St.	16.0	192.6	4.0	92.4	86.4
8	76	20	800	Dover St.	8.0	200.6	2.0	46.2	43.2
9	43	16	2560	Washington St.	25.6	226.2	6.9	128.0	121.0
10	30	20	1040	Dover St.	10.4	236.6	2.0	60.1	56.2
11	78	16	450	Congress St.	4.5	241.1	1.7	22.5	21.2
12	77	30	1600	Congress St.	16.0	257.1	2.5	113.0	109.0
13	69	16	1600	C Street	16.0	273.1	.1	46.6	42.1
14	67	30	1920	Broad St.	19.2	292.3	3.0	136.0	131.0
15	68	16	5120	Atlantic Ave.	51.2	343.5	3.0	256.0	241.0
16	24	30	5600	Southhampton St.	56.0	399.5	9.0	396.0	383.0
17	71	16	3200	Atlantic Ave.	32.0	431.5	10.0	160.0	151.0
18	66	30	2000	Congress St.	20.0	451.5	3.0	141.0	137.0
19	23	20	5120	Boston St.	51.2	502.7	6.0	296.0	276.0
20	79	20	1120	Dorchester Ave.	11.2	513.9	.9	64.7	60.5
21	35	16	9100	Columbia Rd.	91.0	604.9	11.7	265.0	239.0
22	72	20	5290	East 3rd	52.9	667.8	2.4	189.0	169.0
23	38	20	1840	West 4th	18.4	686.2	4.0	65.8	58.9
24	37	20	800	Dorchester Ave.	8.0	694.2	2.0	28.6	25.6
25	36	20	880	Telegraph Hill	8.8	703.0	8.0	31.5	28.2
26	34	20	1760	Dorchester Ave.	17.6	720.6	2.0	62.9	56.3
27	20	16	3200	Harrison Ave.	32.0	752.6	6.9	160.0	151.0
28	21	24	6720	Dudley St.	67.2	809.8	18.0	267.0	245.0
29	19	16	3840	Shawmut Ave.	38.4	848.2	6.1	112.0	101.0
30	82	16	2000	Albany St.	20.0	868.2	7.8	99.9	94.3

TABLE SLS-71 (Continued)

No.	Pipe No.	Diameter	Length (Feet)	Street Location	Cost in Thousand Dollars (1967) Cleaning & Lining	Cumulative Cleaning & Lining	Valves & Fittings	Replacement Cast Iron	Replacement Concrete
31	27	20	1600	Brookline St.	16.0	884.2	4.0	57.2	51.2
32	73	24	1040	Dudley St.	10.4	894.6	3.0	41.3	37.9
33	18	24	3680	Roxbury St.	36.8	931.4	12.0	146.0	134.0
34	62	24	1920	Hanover St.	19.2	950.6	6.0	76.2	70.0
35	61	24	880	Hanover St.	8.8	959.4	---	57.7	54.8
36	56	20	1760	Parmenter St.	17.6	977.0	---	102.0	95.0
37	64	36	2400	Harrison Ave.	24.0	1001.0	16.0	130.0	108.0
38	52	30	4960	Tremont St.	49.6	1050.6	9.0	350.0	339.0
39	65	16	3360	Kneeland St.	33.6	1084.2	7.8	168.0	158.0
40	60	16	2800	State St.	28.0	1112.2	1.6	140.0	132.0
41	63	30	800	Congress St.	8.0	1120.2	6.0	56.5	54.7
42	74	30	1200	Mass. Ave.	12.0	1132.2	3.0	84.8	82.1
43	75	30	950	Mass. Ave.	9.5	1141.7	3.0	67.1	65.0
44	28	24	1650	Mass. Ave.	16.5	1158.2	6.0	108.0	103.0
45	14	24	2720	Mass. Ave.	27.2	1185.4	6.0	178.0	169.0
46	11	48	1440	Longwood St.	14.4	1199.8	4.5	146.0	137.0
47	7	48	1920	Longwood St.	19.2	1219.0	4.5	143.0	131.0
48	8	30	1600	Francis St.	16.0	1235.0	6.0	71.8	68.2
49	16	16	592	Huntington Ave.	5.92	1240.9	4.4	29.6	27.9
50	15	16	4000	Huntington Ave.	40.0	1280.9	2.5	200.0	189.0
51	13	16	5120	Huntington Ave.	51.2	1332.1	7.8	256.0	241.0
52	48	48	640	Charles St.	6.4	1338.5	4.5	64.9	61.0
53	3	40	4160	Beacon St.	41.6	1380.1	4.0	364.0	342.0
54	47	40	3200	Beacon St.	32.0	1412.1	4.0	280.0	263.0
55	5	48	2240	Comm. Ave.	22.4	1434.5	4.5	227.0	214.0
56	46	48	3350	Comm. Ave.	33.5	1468.0	9.0	249.0	229.0
57	4	48	1920	Comm. Ave.	19.2	1487.2	9.0	143.0	131.0
58	6	48	4960	Brookline St.	49.6	1536.8	13.5	369.0	339.0
59	2	48	2880	Beacon St.	28.8	1565.6	4.5	214.0	197.0
60	51	30	1280	Hancock St.	12.8	1578.4	3.0	90.4	87.6

Boston Water

CHAPTER SHS

SOUTHERN HIGH SERVICE

ABSTRACT: Large variations in pressure occur daily in the SHS due to hydraulic losses in both the SHS and the MDC systems. While the present unimproved network would be totally inadequate for future demands, it could be made adequate by a comprehensive program of cleaning and cement-lining. The rehabilitated network would result in improved pressure and flow conditions for fire fighting in many areas without the use of mobile pumpers. For future fire fighting purposes in the Central Business District, the HPFS should be interconnected with the SHS. A sequence of cleaning and cement-lining of major mains in the SHS is presented. During the execution of this sequence, there will be major disturbances and reversals of flow in the normal operating pattern of the SHS. Because of scheduled improvements to the MDC system, it will be necessary to increase the size of existing MDC connections and to add an additional trunk main. Interconnection with the SLS through pressure reducing valves is recommended.

Charles A. Maguire & Associates

Boston Hartford Providence

CONCLUSIONS

The following conclusions were made:

1. The maximum variation in total head during the day may be as much as 45 feet near Node 27 on Northern Avenue at Terminal Street. This variation in total head is caused by excessive hydraulic losses in both the MDC and Boston networks.

2. Pressure throughout the SHS is in general adequate for normal domestic consumption. Local areas of low pressure occur at high elevations. In these areas improvements to the network by cleaning and cement-lining of existing mains will have no significant beneficial effect on flow pressures.

3. Minimum pressures throughout the SHS do not occur at the same time of the day. Future operating procedures could be devised to take advantage of this time lag but would require a reasonable level of sophisticated equipment, intensive continuing engineering studies, and a well-trained technical staff.

4. The direction of flow in the trunk mains of the SHS does not normally reverse during the day. Abnormal conditions such as fire flows, mains temporarily out of service for cleaning and cement-lining, and increased pressure levels caused by improvement to the MDC network may cause local flow reversals.

5. It is impractical to establish a sequence for rehabilitation which will avoid flow reversals in unlined pipes throughout the rehabilitation sequence. It should be expected that some inconveniences will arise when the SHS undergoes rehabilitation.

6. The existing SHS network without rehabilitation will be totally inadequate to supply anticipated demands for the year 2020.

7. The existing SHS network, when completely rehabilitated will perform better under future loading conditions than it does under present consumptions.

8. Smaller trunk mains in highly looped areas can be shut down for rehabilitation without adverse effects on other parts of the network.

9. With rehabilitation of the smaller distribution mains the SHS is capable of providing large quantities of water at a pressure which is adequate for effective fire fighting in many areas.

10. In South Boston the SHS requires mobile pumpers to obtain adequate volumes of water at reasonable pressures for fire fighting. Rehabilitation of smaller SHS mains in South Boston will not obviate the need for mobile pumpers.

11. The MDC 48-inch pipe leading to Boston from Venturi No. 5 has a C-coefficient of approximately 65, and is the principal cause of the wide variation in total head near Node 8 at Heath Street and Huntington Avenue.

12. In North Dorchester approximately 4,000 GPM can be obtained at 50 psi in the trunk main system near Node 43 on Neponset Avenue. Fire fighting procedures in this area would be significantly influenced by rehabilitation of the smaller distribution mains leading to hydrants.

13. The existing unimproved SHS network can supply approximately 26,000 GPM to the HPFS at 50 PSI in addition to the domestic consumption for the peak hour of the study day of 1966. This discharge will be reduced to approximately 10,000 GPM if the water is desired at a pressure of 80 PSI.

14. If the MDC system is improved to raise pressures slightly above the 1966 levels, the SHS could supply approximately 42,000 GPM at 80 PSI to the HPFS without pumping. If it is desired to operate the HPFS at greater pressures, the maximum discharge available will be decreased correspondingly.

15. Approximately 23,000 GPM can be obtained from the fully rehabilitated SHS with the anticipated study day consumptions for the year 2020. This discharge would be independent of improvements to the MDC system.

16. In Hyde Park near Node 46, at the intersection of Providence Street and River Street approximately 3,000 GPM can be obtained from the trunk mains at 50 PSI during the peak hour of the study day. The smaller distribution mains have an important influence on fire fighting procedures in this area and should be rehabilitated as soon as possible.

17. The SHS can supply approximately 10,000 GPM at 50 PSI near Mass. Avenue on Tremont Street at the same time that large quantities of water are supplied to the HPFS from the SHS and the domestic consumption is at the level of the peak hour of the study day of 1966. This result indicates that when extremely large quantities of water are required for emergency conditions the major limitation for water supply is the MDC supply system and the delivery pressures at the Boston line.

RECOMMENDATIONS

The following recommendations are made:

1. The program for cleaning and cement-lining of the SHS should eventually include all trunk mains and most of the smaller distribution pipes. Trunk mains not appearing in Table SHS63 may be scheduled for rehabilitation independently of the pipes shown in the table.

2. The smaller mains in the trunk main network should be cleaned and lined prior to undertaking the major rehabilitation program. This procedure will minimize undesirable effects resulting from temporarily putting major mains out of service for cleaning and lining.

3. The 48-inch MDC pipe leading from Fisher Hill Reservoir should be rehabilitated at the earliest possible time. Rehabilitation of this pipe is dependent upon prior rehabilitation of the major mains in the SHS and provision for MDC venturi meters 6 and 94 to deliver approximately 18 and 27 MGD respectively.

4. The connection to MDC meter 51 should be enlarged to allow this meter to deliver as much as 15 MGD to the SHS during future operations. Similar provisions should be made to increase the capacity of MDC Venturis 7, 94 and 6.

5. It is recommended that a 36-inch diameter pipe be constructed to connect the new MDC shaft near Morton Street and American Legion Highway with the 36-inch SHS pipe in Ruthven Street. This new pipe would cost approximately $900,000. If the cleaning and lining rehabilitation program is delayed, this new pipe would play a major role in providing adequate capacity for future consumption in South Dorchester.

6. The twin 36-inch diameter MDC pipes currently supplying water to Nodes 42, 56, 55, and 50 should be cleaned and lined after the new MDC shaft and tunnel is in operation in this area.

7. The scheduling of improvements to the SHS in North Dorchester should be closely coupled with the scheduling for improvements to the SLS in the same area. A pressure-reduced, 20-inch connection between the two services is recommended for this area.

8. Rehabilitation of the 16-inch main in Boston Street (Pipe 33 between Nodes 24 and 28) and the 16-inch main in Congress Street (Pipe 42 between Nodes 26 and 30) will require temporary pipes of comparable capacity or alternative methods of fire protection.

9. Where parallel SHS mains exist in nearby streets, the sequence for cleaning and lining should begin with the smallest of the parallel pipes. The parallel 20-inch and 40-inch SHS mains in Huntington Avenue, pipes 23 and 24 in Newbury and Boylston Streets, and the equivalent Pipe 5 between Nodes 3 and 6 in Columbus Avenue can be cleaned and lined using this procedure.

10. When Pipe 10 is taken out of service for cleaning and lining between Nodes 8 and 18 on Huntington Avenue a temporary 24-inch parallel pipe will be required to replace some of the lost capacity.

11. In conjunction with the cleaning and lining of Pipe 10, the large diameter pipes crossing Parker Hill (Pipes 92 and 3) should be previously rehabilitated and the short length of 12-inch pipe near Node 61 at the top of Parker Hill should be replaced with a larger diameter pipe. Pipes 30 and 92 will carry very large flows when Pipe 10 is out of service and it is essential that these two pipes be previously rehabilitated for this purpose.

12. It is recommended that after the SHS has been completely rehabilitated, an intensive study of fire department practices and equipment be made to reconsider methods of fighting fires and using mobile pumping equipment. The SHS will be capable of supplying adequate pressures and quantities of water for effective fire fighting in many areas without mobile booster pumping.

13. It is recommended that the improved SHS be incorporated into the HPFS system. The relative dependence upon the SHS and the fixed HPFS pumping stations in the central business district should be determined by a comprehensive study of the required fire fighting capabilities in this area.

THE SOUTHERN HIGH SERVICE

The Southern High Service (SHS) supplies water to all parts of Boston except Charlestown and East Boston, (Figure DN2). Unlike the Southern Low Service (SLS), the SHS receives inputs from the Metropolitan District Commission (MDC) system at several locations deep within the SHS itself. At the present time (1967) these internal inputs are relatively small. Most of the present water supply to the SHS comes from large MDC lines terminating near the Brookline-Boston boundary.

PRESSURE VARIATIONS

The maximum total head in the SHS occurs during periods of very low demand and seldom exceeds 270 feet. Pressures within the SHS depend upon hydraulic losses in the Boston system as well as losses in MDC pipes leading to Boston. A simulated 24-hour operation of the SHS is presented in Figure SHS1 and Tables SHS1 to SHS24. These results show a maximum total head variation of approximately 25 feet at Node 8 near Heath Street and Huntington Avenue. Field measurements showed that the 48-inch diameter MDC pipe leading to Node 8 has a C-coefficient of approximately 65 and is the principal cause of the wide variation in total head at this point. At the MDC meters near Perkins and Prince Streets and Prince Street and Arborway the total head variation is approximately 15 feet. At Node 27 on Northern Avenue at Terminal Street, the variation in head during the day may be as much as 45 feet. This variation results from the combined losses in the MDC system and the Boston SHS network. One of the principal objectives of the present study was to determine how this large variation in total head might be avoided.

Network Operation: Closer study of Figure SHS1 shows that the minimum pressure near Node 46 occurs later in the evening than those which occur at other locations in the network (for example, Node 31 has a minimum at 11 AM). In the future, it may be desirable to consider controlling the operation of the network to take advantage of this time lag. For example, water may be rerouted through different mains by controlling valve closures within the network. This rerouting could result in increased local pressures when extremely low pressures would be undesirable. At other times of the day the network could be operated by manipulating valves to raise pressures at other locations. The effective use of operating procedures to optimize the use of existing pipes and valves requires equipment, intensive continuing engineering studies, and a well trained technical staff.

Flow Reversals: Figures SHS2 and SHS3 show total head contours for 11 AM and 4 PM respectively. While there are local small differences in pressure, the overall contour patterns of total head are similar. This indicates that the direction of flow in the trunk main is the same for both of these hours. This observation applies to other hours of the study day. Some local reversals may occur when new connections to the MDC are made or when pressure levels are raised by improvements to the MDC network.

Trunk Main Pressures: The pressure head contours for 11 AM are plotted on Figure SHS 4. The pressure contours reflect both hydraulic losses in the network and points of high elevation. The area of low pressure near Node 5 on Blue Hill Avenue results from the high elevation. Improvements to the network by cleaning and cement-lining existing mains will have no significant effect on this low pressure. A similar situation exists on Parker Hill near Node 61. A separate section of this report discusses fully the significance of low pressures at these high elevations (Chapter PH).

As discussed elsewhere (Chapter HPFS)a pressure of approximately 115 ft. (50 PSI) is necessary to effectively fight fires from hydrants without using mobile booster pumps. Figure SHS4 shows that many areas of the SHS provide higher trunk main pressures than this minimum. With rehabilitation of the smaller distribution mains the SHS is capable of providing large quantities of water at a pressure which is adequate for effective fire fighting.

FUTURE OPERATION

The levels and patterns of future consumption (Table WSU5) were used to study the future operation of the SHS. The results shown on Figure SHS5 represent the hypothetical case for which a high level of future consumption is imposed on the existing (1967) network of unimproved pipes. The pressures imposed on the Boston system were assumed to correspond to those minimums imposed by the fully rehabilitated MDC system. The severity of the hydraulic loading is emphasized by noting that the contour interval on Figure SHS5 is double that of the comparable figure for 1966, Figure SHS2. The extremely steep hydraulic gradients indicate a lack of reserve capacity for fire flows and a loss of flexibility for emergency operation while mains are temporarily out of service. The condition depicted by Figure SHS5 should be avoided at any reasonable cost.

Figure SHS6 represents another future hypothetical condition. In this case, the same patterns and level of consumption depicted by Figure SHS5 were imposed upon the completely rehabilitated network. It is seen that the rehabilitated SHS performs better under future loading conditions than the existing

SHS does under present consumptions, (Figure SHS2.) The improvement results from the rehabilitation of the pipes in the Boston system and anticipated improvements in the MDC system. The conclusion reached was that if all existing trunk mains in the SHS could be rehabilitated, the network would be adequate for future consumptions. It remained to establish a rehabilitation sequence that would minimize disturbances to the SHS.

TRUNK MAIN FIRE FLOW CAPACITY

The capacity of the SHS trunk main system to deliver fire flows was examined by computer calculations, (Tables SHS27 to SHS39.) One of the principal concerns was to determine the volume of water which could be supplied to the High Pressure Fire Service (HPFS) at adequate pressures for effective fire fighting. As mentioned in Chapter HPFS, hand-held hoses require nozzle pressures of approximately 115 feet (50 PSI) and deck guns mounted on mobile equipment require a minimum pressure of approximately 184 feet (80 PSI). The computer studies were concentrated on determining the maximum discharges available at these pressures.

The results showed that the existing, unimproved network is capable of supplying approximately 26,000 GPM to HPFS at 50 PSI in addition to the domestic consumption at the peak hour of the study day of 1966. This supply to the HPFS would be reduced to approximately 10,000 GPM if the water was required at a pressure of 80 PSI. These results presuppose adequate interconnection with the HPFS at locations close to major trunk SHS mains. Anything which is done to improve the operation of the SHS, including rehabilitation of pipes or improvements to the MDC system, will allow larger amounts of water or greater pressures to be obtained from the HPFS.

Table SHS36 shows that approximately 42,000 GPM at 80 PSI could be obtained from the HPFS without pumping if many of the major SHS trunk mains are cleaned and lined and pressures from the MDC system are raised slightly above 1966 levels. If it is desirable to operate the HPFS at slightly greater pressures, the maximum discharge available will be decreased. A further computer study, shown in Table SHS39, showed that approximately 23,000 GPM could be obtained with the anticipated study day consumptions in the year 2020 and the low input pressures which would result if the MDC system were not rehabilitated. This result shows that large fire flows will be available in the central business district for future conditions if the major trunk mains in Boston are rehabilitated and unforseen difficulties prevent improvements in the MDC supply to Boston. Considering the present capacity of the HPFS pumping stations (approximately 18,000 GPM maximum) it is evident that the SHS could provide a viable alternative to fixed pumping stations in the central business district.

Fire flow capacities at other locations in the SHS were investigated. In South Boston it was found that areas served by the SHS require mobile pumpers to obtain adequate volumes of water at reasonable pressures. In North Dorchester, at Node 43 on Neponset Avenue, approximately 4,000 GPM can be obtained at 50 PSI in the trunk main system. Fire fighting procedures in this area would be significantly influenced by rehabilitation of the smaller distribution mains leading to the hydrants.

In Hyde Park, near Node 46 at the intersection of Providence Street and River Street, approximately 3,000 GPM can be obtained from the trunk mains at 50 PSI during the peak hour of the study day. Once again, the smaller distribution mains have an important influence on fire-fighting procedures. On Tremont Street near Mass. Avenue the SHS could supply approximately 10,000 GPM at 50 PSI at the same time that large quantities of water are supplied to the HPFS from the SHS. This conclusion indicates that if the quantities of water demanded become extremely large, the major limitation is the MDC supply system.

CLEANING AND LINING SEQUENCE

As discussed in Chapter SLS during the rehabilitation sequence, it would be desirable to minimize high velocities and flow reversals in unlined pipes which might contain appreciable quantities of sediment. The analysis of the SHS showed that this goal cannot be accomplished throughout the sequence of rehabilitation. The undesirable effects resulting from temporarily putting major mains out of service for cleaning and lining can be minimized by cleaning and lining smaller mains in the network prior to undertaking the major rehabilitation program. This procedure may result in an impractical delay in executing the major portion of the program. It should be expected therefore that some inconveniences will arise when the SHS undergoes rehabilitation.

Inspection of Figure SHS2 indicated that many of the trunk mains could be shut down temporarily for cleaning and cement-lining without adverse effects on the network. Tables SHS61 and SHS62 show the operation of the network at the peak hour of the study day after this first phase of rehabilitation has been completed (Phase 1). The extent of improvements to the MDC system will have a major effect on the performance of the SHS after Phase 1 of the rehabilitation program has been completed.

Several major flow reversals will occur in the partially rehabilitated SHS if the MDC supplies water to Boston at pressures higher than those of 1966. During

Phase 1, reversals may be expected in pipes 12, 25, 29, 46, 54, 57, 58, and 62. Other reversals will occur in the smaller local grids located near these trunk mains.

The sequence of rehabilitation after Phase 1 is somewhat critical and a detailed computer analysis was carried out to insure that the capacity of the SHS trunk main system would not be seriously impaired while major mains were temporarily out of service. As discussed before, it was considered impractical to avoid major flow reversals. Tables SHS50 to SHS54 show that Pipes 90, 6, 7, 9, and 50 may be rehabilitated without adverse effects on the network. A temporary problem will occur, however, when rehabilitation of the SHS pipes in South Boston is attempted. The 16-inch main in Boston Street (Pipe 33 between Nodes 24 and 28) and the 16-inch main in Congress Street (Pipe 42 between Nodes 26 and 30) provide the only SHS sources to South Boston. If either main is temporarily shut down the other main will be unable to provide adequate capacity to the SHS in that area, (Table SHS55.) Rehabilitation of these mains will require temporary pipes of comparable capacity or alternative methods of fire protection during cleaning and lining operations in these areas.

In Huntington Avenue, there are parallel 20-inch and 40-inch SHS mains. After Phase 1 of the rehabilitation program has been completed, it would be desirable to clean and line the 20-inch main before taking the 40-inch main out of service for cleaning and lining. The result will be to re-route most of the large quantities of flow formerly carried by these two mains, but there should be no serious loss of fire fighting capability while the 40-inch main is out of service. The parallel pipes 23 and 24 in Newbury and Boylston Streets and the equivalent Pipe 5 between Nodes 3 and 6 near Columbus Avenue can be cleaned and lined using a similar procedure.

The most serious bottleneck in the rehabilitation program for the SHS is involved in the cleaning and lining of Pipe 10 between Nodes 8 and 18 on Huntington Avenue. When this pipe is taken out of service, a temporary parallel pipe will be required to replace some of the lost capacity. Preliminary calculations show that a 24-inch pipe connecting Nodes 8 and 18 would provide adequate temporary capacity if the pipes crossing Parker Hill (92 and 3) have been previously rehabilitated and a length of 12 inch pipe near Node 61 at the top of Parker Hill is replaced with a larger diameter pipe or augmented by an additional pipe (see Pipes 56, 57, 58, 59; Figure PH5).

As outlined in Chapter PH the strengthening of these trunk mains crossing Parker Hill is not essential for the operation of the grid on Parker Hill itself. However, Pipes 30 and 92 will carry very large flows when Pipe 10 is out of service and it is essential that these two pipes be previously rehabilitated for this purpose.

As discussed in Chapter SLS, many major pipes can be rehabilitated without adverse effects on the remaining parts of the network while these pipes are temporarily out of service. Smaller trunk mains in highly looped areas can be shut down temporarily for rehabilitation. For example, 12-inch pipes in South Dorchester, such as Pipe 66, between Nodes 37 and 66, can be cleaned and lined without major effects on other parts of the SHS network.

The program for cleaning and cement-lining should eventually include all of the trunk mains in the SHS. Table SHS63 shows the recommended sequence for rehabilitation of those pipes which are considered essential for the efficient operation of the SHS. Pipes listed as having low C-coefficients, but not appearing in this Table, should be cleaned and lined as part of the overall rehabilitation program. This latter group of pipes may be scheduled for rehabilitation after the principal mains have been cleaned and lined.

INTERACTION WITH MDC REHABILITATION

The 48-inch MDC pipe leading from Fisher Hill Reservoir (MDC Meter No. 5) should be rehabilitated at the earliest possible time. This pipe has an important effect on the operation of the SHS pipes which supply Boston Proper. However, rehabilitation of this pipe should be delayed until after the first phase of the rehabilitation program and the new MDC 10-foot diameter SHS tunnel has been completed and connected to the Boston network. The existing connections to the MDC system at Nodes 10 and 52 (MDC Venturi 6 and 94) will have to deliver approximately 18 and 27 MGD respectively when MDC Meter No. 5 is temporarily out of service. When connection to the MDC shaft is made at Meters 6 and 94 this requirement should be borne in mind.

MODIFICATIONS TO EXISTING MDC CONNECTIONS

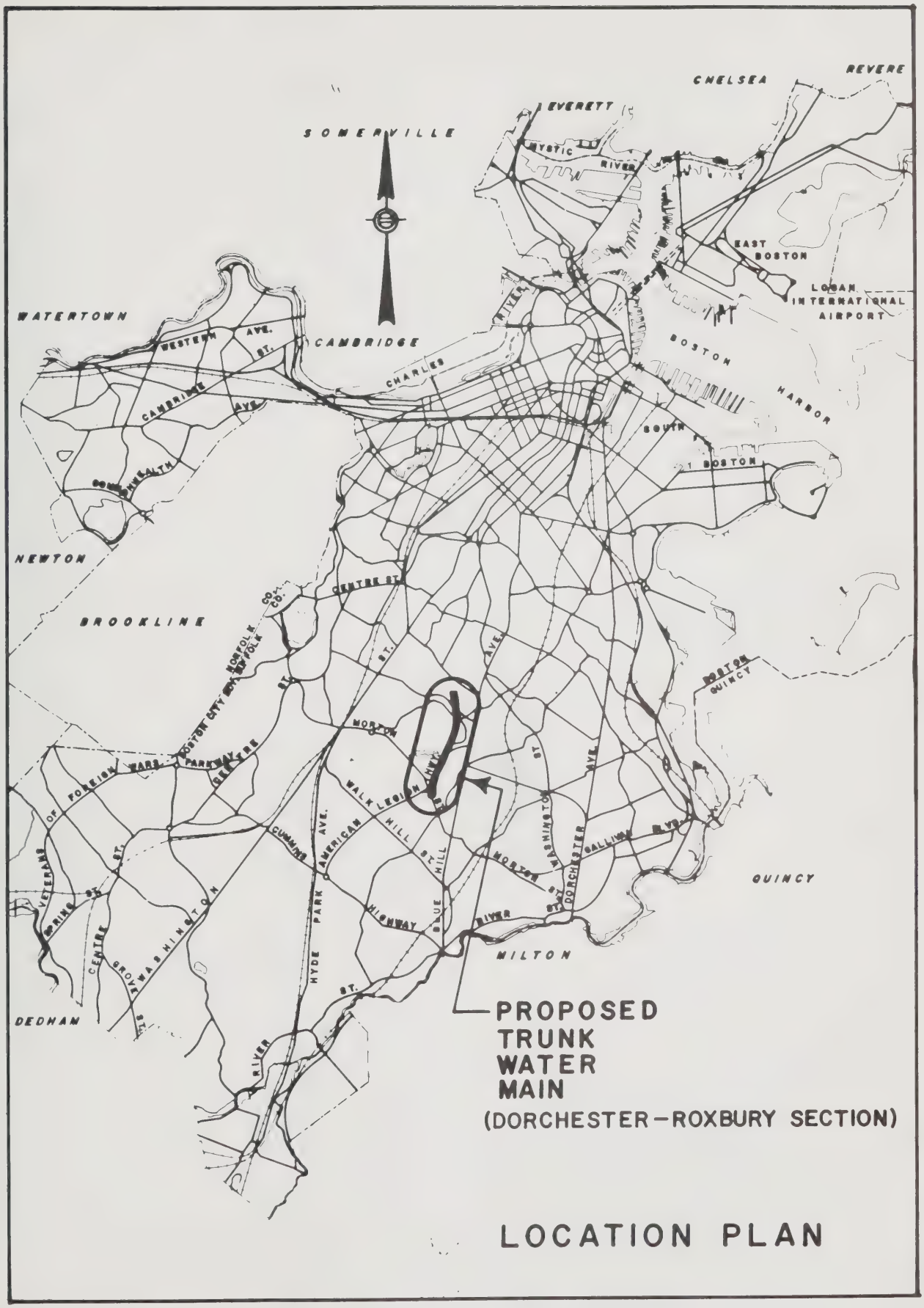
For future requirements, and to provide the needed flexibility during the rehabilitation sequence, it will be necessary to increase the size of the MDC connections at Nodes 42, 55, 52, and 10 (MDC Meters 51, 7, 94, and 6). The new MDC shaft near Morton Street and American Legion Highway should be connected to the existing twin 36-inch diameter pipes presently supplying those areas of the SHS in Hyde Park and South Dorchester after these MDC pipes have been cleaned and cement-lined. The additional capacity afforded by these improvements will make it practical to utilize the 30-inch SHS pipe in Washington Street in South Dorchester. To do this, improvements to MDC meter 51 may be required to increase its capacity to approximately 15 MGD. As mentioned previously, the MDC supply at Meters 94 and 6 will be called upon to deliver greatly increased demands in the future. When these improvements are made the relative importance of MDC Meter 5 at Fisher Avenue will be decreased during the normal consumption patterns.

INTERCONNECTION WITH THE SLS

In Chapter SLS the need for a pressure reduced connection with the SHS in North Dorchester is discussed. This interconnection will have no adverse effects on the SHS after the major portion of the rehabilitation program has been completed. The scheduling of improvements to the SLS in North Dorchester should be closely coupled with the scheduling of improvements to the SHS in the same area.

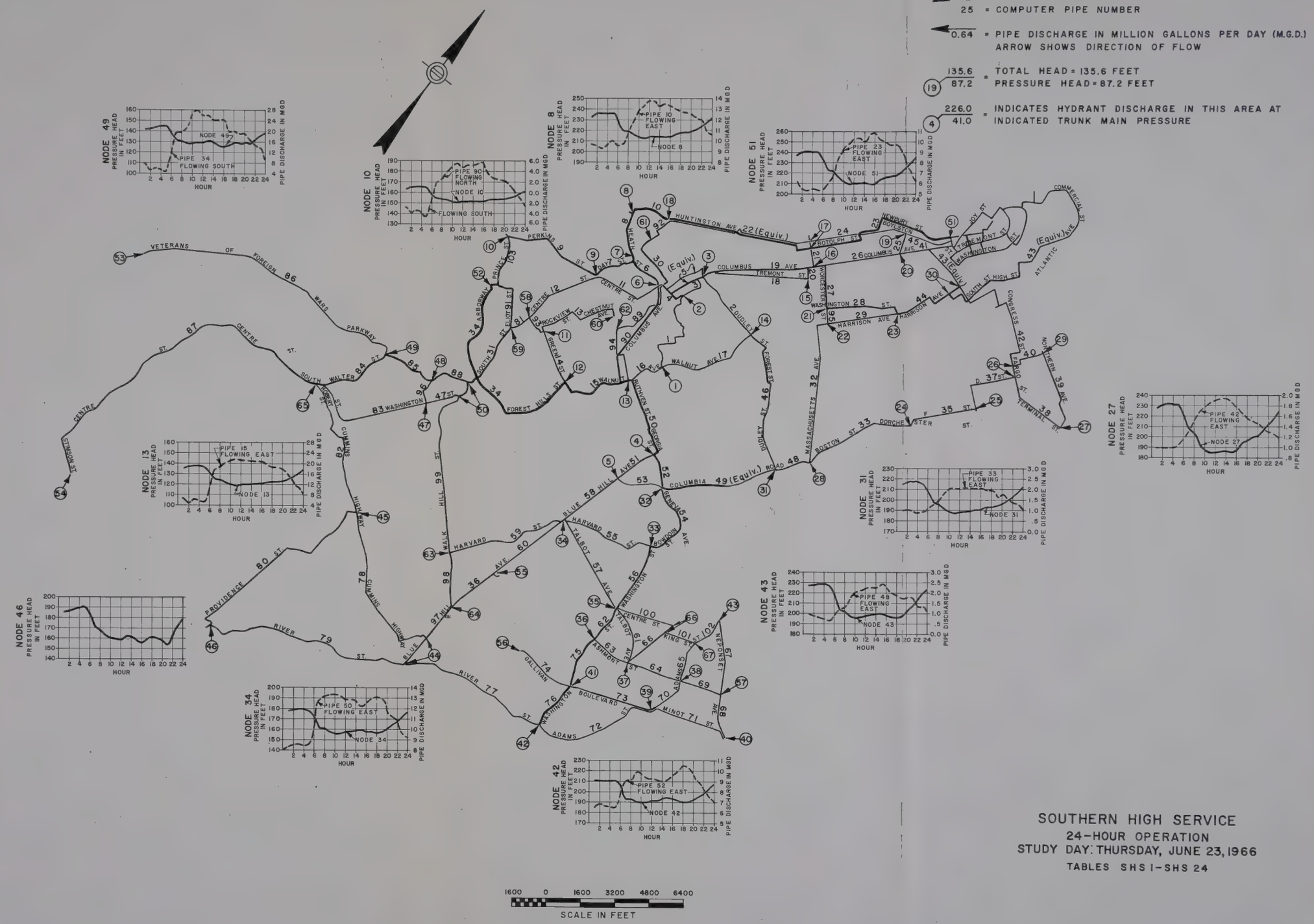
NEW SHS TRUNK MAIN

Pipe No. 50 in Ruthven Street provides the only major link between portions of the SHS in Boston Proper and West Roxbury and areas in North Dorchester and Hyde Park. At the present time, because of the poor condition of the MDC system, these latter areas depend on the Ruthven Street trunk main as a major source of water. When the MDC system has been improved, the Hyde Park and South Dorchester areas will be essentially independent from the remaining portions of the SHS. When this happens the Ruthven Street trunk main could be used as an alternative source of supply to West Roxbury by the addition of a new trunk main from the vicinity of the new MDC shaft at Morton Street and American Legion Highway. The addition of this new main would greatly increase the flexibility of the SHS to supply water under unusual conditions. A pipe of adequate capacity for this purpose (approximately 36-inch diameter) would cost approximately $900,000. If the cleaning and lining rehabilitation program is delayed, this new pipe would play a major role in providing adequate capacity for future consumptions in South Dorchester.



BOSTON WATER

PIPE NUMBER	DIAMETER INCHES	HAZEN-WILLIAMS COEFFICIENT
1	16	55.0
2	12	65.0
3	16	70.0
4	24	60.0
5	36 (Equiv.)	60.0
6	36	75.0
7	36	60.0
8	36	75.0
9	36	60.0
10	42	70.0
11	16	45.0
12	16	45.0
13	16	45.0
14	12	45.0
15	48	110.0
16	12	70.0
17	12	70.0
18	20	70.0
19	30	60.0
20	20	70.0
21	24	50.0
22	44 (Equiv.)	70.0
23	42	70.0
24	20	70.0
25	16	70.0
26	20	70.0
27	30	40.0
28	30	40.0
29	16	60.0
30	24	65.0
31	24	45.0
32	16	60.0
33	16	75.0
34	48	110.0
35	16	70.0
36	16	50.0
37	16	70.0
38	16	70.0
39	16	70.0
40	16	70.0
41	20	70.0
42	16	70.0
43	16 (Equiv.)	50.0
44	30	50.0
45	20	70.0
46	16	60.0
47	12	55.0
48	16	75.0
49	22 (Equiv.)	75.0
50	36	70.0
51	12	55.0
52	36	70.0
53	16	75.0
54	30	70.0
55	12	60.0
56	30	70.0
57	16	80.0
58	12	55.0
59	12	50.0
60	16	50.0
61	16	70.0
62	30	70.0
63	12	50.0
64	12	50.0
65	20	60.0
66	12	50.0
67	12	50.0
68	16	60.0
69	16	50.0
70	20	40.0
71	12	50.0
72	12	50.0
73	24	40.0
74	16	70.0
75	30	70.0
76	36	70.0
77	12	50.0
78	16	100.0
79	16	70.0
80	16	110.0
81	12	45.0
82	16	65.0
83	12	55.0
84	24	130.0
85	24	130.0
86	16	130.0
87	20	130.0
88	24	130.0
89	16	50.0
90	36	70.0
91	24	45.0
92	20	65.0
93	16	45.0
94	16	50.0
95	16	50.0
96	16	55.0
97	16	50.0
98	12	50.0
99	12	60.0
100	12	60.0
101	12	60.0
102	20	60.0
103	24	45.0



SOUTHERN HIGH SERVICE
24-HOUR OPERATION
STUDY DAY: THURSDAY, JUNE 23, 1966
TABLES SHS 1-SHS 24

FIGURE-SHS 1

PIPE NUMBER	DIAMETER INCHES	HAZEN-WILLIAMS COEFFICIENT	PIPE DISCHARGE IN MGD
1	16	55.0	0.8
2	12	85.0	0.7
3	16	70.0	1.0
4	24	60.0	2.5
5	36 (Equiv.)	60.0	8.7
6	36	75.0	6.8
7	36	60.0	6.5
8	36	75.0	0.6
9	36	60.0	8.6
10	42	70.0	13.1
11	16	45.0	0.5
12	16	45.0	0.4
13	16	45.0	0.6
14	12	45.0	0.4
15	48	110.0	22.8
16	12	70.0	1.0
17	12	70.0	0.6
18	20	70.0	1.7
19	30	60.0	4.3
20	20	70.0	1.5
21	24	50.0	1.1
22	44 (Equiv.)	70.0	13.4
23	42	70.0	9.7
24	20	70.0	1.5
25	16	70.0	0.1
26	20	70.0	1.7
27	30	40.0	5.1
28	30	40.0	3.5
29	16	60.0	0.6
30	24	65.0	1.3
31	24	45.0	2.2
32	16	60.0	0.7
33	16	75.0	2.0
34	48	110.0	24.3
35	16	70.0	0.3
36	16	50.0	2.1
37	16	70.0	0.4
38	16	70.0	0.7
39	16	70.0	0.5
40	16	70.0	0.6
41	20	70.0	1.3
42	16	70.0	1.9
43	16 (Equiv.)	50.0	1.1
44	30	50.0	3.1
45	20	70.0	1.3
46	16	60.0	0.2
47	12	55.0	0.4
48	16	75.0	2.1
49	22 (Equiv.)	75.0	3.0
50	36	70.0	13.2
51	12	55.0	0.4
52	36	70.0	9.5
53	16	75.0	0.6
54	30	70.0	5.3
55	12	60.0	0.0
56	30	70.0	3.5
57	16	80.0	0.6
58	12	55.0	0.3
59	12	50.0	0.3
60	16	50.0	1.7
61	16	70.0	1.3
62	30	70.0	1.0
63	12	50.0	0.5
64	12	50.0	0.6
65	20	60.0	0.3
66	12	50.0	0.4
67	12	50.0	0.3
68	16	60.0	0.2
69	16	50.0	0.9
70	20	40.0	1.6
71	12	50.0	0.5
72	12	50.0	0.4
73	24	40.0	2.4
74	16	70.0	0.4
75	30	70.0	0.3
76	36	70.0	2.9
77	12	50.0	0.4
78	16	100.0	1.3
79	16	70.0	0.5
80	16	110.0	1.5
81	12	45.0	0.8
82	16	65.0	1.4
83	12	55.0	0.2
84	24	130.0	3.5
85	24	130.0	4.2
86	16	130.0	0.6
87	20	130.0	1.3
88	24	130.0	5.0
89	16	50.0	0.1
90	36	70.0	5.6
91	24	45.0	3.2
92	20	65.0	0.8
93	16	45.0	0.9
94	16	50.0	0.7
95	16	50.0	1.5
96	16	55.0	0.7
97	16	50.0	1.0
98	12	50.0	0.1
99	12	60.0	0.8
100	12	60.0	0.7
101	12	60.0	0.8
102	20	60.0	0.9
103	24	45.0	2.2

SOUTHERN HIGH SERVICE
STUDY DAY: THURSDAY, JUNE 23, 1966
TOTAL HEAD CONTOURS, 11-AM TABLE SHS 11

PIPE NUMBER	DIAMETER INCHES	HAZEN-WILLIAMS COEFFICIENT	PIPE DISCHARGE IN MGD
1	16	55.0	0.6
2	12	65.0	0.6
3	16	70.0	1.2
4	24	60.0	2.0
5	36 (Equiv.)	60.0	8.0
6	36	75.0	5.7
7	36	60.0	6.6
8	36	75.0	0.7
9	36	60.0	8.3
10	42	70.0	13.4
11	16	45.0	0.5
12	16	45.0	0.4
13	16	45.0	0.5
14	12	45.0	0.4
15	48	110.0	21.1
16	12	70.0	0.9
17	12	70.0	0.6
18	20	70.0	1.9
19	30	60.0	4.8
20	20	70.0	1.7
21	24	50.0	0.9
22	44 (Equiv.)	70.0	14.1
23	42	70.0	10.9
24	20	70.0	1.7
25	16	70.0	0.1
26	20	70.0	1.9
27	30	40.0	5.4
28	30	40.0	3.7
29	16	60.0	0.7
30	24	65.0	1.4
31	24	45.0	2.8
32	16	60.0	0.6
33	16	75.0	2.0
34	48	110.0	22.3
35	16	70.0	0.3
36	16	50.0	2.0
37	16	70.0	0.3
38	16	70.0	0.6
39	16	70.0	0.5
40	16	70.0	0.6
41	20	70.0	1.5
42	16	70.0	1.8
43	16 (Equiv.)	50.0	1.1
44	30	50.0	3.3
45	20	70.0	1.5
46	16	60.0	0.5
47	12	55.0	0.4
48	12	75.0	2.3
49	22 (Equiv.)	75.0	2.8
50	36	70.0	12.3
51	12	55.0	0.5
52	36	70.0	9.7
53	16	75.0	0.7
54	30	70.0	5.5
55	12	60.0	0.2
56	30	70.0	3.3
57	16	80.0	0.3
58	12	55.0	0.4
59	12	50.0	0.4
60	16	50.0	1.3
61	16	70.0	1.4
62	30	70.0	0.2
63	12	50.0	0.5
64	12	50.0	0.7
65	20	60.0	0.3
66	12	50.0	0.4
67	12	50.0	0.3
68	16	60.0	0.3
69	16	50.0	1.0
70	20	40.0	1.7
71	12	50.0	0.6
72	12	50.0	0.5
73	24	40.0	2.5
74	16	70.0	0.3
75	30	70.0	1.2
76	36	70.0	4.1
77	12	50.0	0.5
78	16	100.0	1.4
79	16	70.0	0.5
80	16	110.0	1.6
81	12	45.0	0.5
82	16	65.0	1.3
83	12	55.0	0.2
84	24	130.0	3.7
85	24	130.0	4.4
86	16	130.0	0.6
87	20	130.0	1.4
88	24	130.0	5.3
89	16	50.0	0.1
90	36	70.0	5.5
91	24	45.0	3.6
92	20	65.0	1.1
93	16	45.0	0.7
94	16	50.0	0.7
95	16	50.0	1.4
96	16	55.0	0.7
97	16	50.0	1.0
98	12	50.0	0.3
99	12	60.0	0.8
100	12	60.0	0.7
101	12	60.0	0.9
102	20	60.0	0.9
103	24	45.0	1.9

SOUTHERN HIGH SERVICE
STUDY DAY: THURSDAY, JUNE 23, 1966
TOTAL HEAD CONTOURS, 4-PM TABLE SHS 16

FIGURE-SHS 3

PIPE NUMBER	DIAMETER INCHES	HAZEN-WILLIAMS COEFFICIENT	PIPE DISCHARGE IN MGD
1	16	55.0	0.8
2	12	65.0	0.7
3	16	70.0	1.0
4	24	60.0	2.5
5	36 (Equiv.)	60.0	8.7
6	36	75.0	6.8
7	36	60.0	6.5
8	36	75.0	0.6
9	36	60.0	8.6
10	42	70.0	13.1
11	16	45.0	0.5
12	16	45.0	0.4
13	16	45.0	0.6
14	12	45.0	0.4
15	48	110.0	22.8
16	12	70.0	1.0
17	12	70.0	0.6
18	20	70.0	1.7
19	30	60.0	4.3
20	20	70.0	1.5
21	24	50.0	1.1
22	44 (Equiv.)	70.0	13.4
23	42	70.0	9.7
24	20	70.0	1.5
25	16	70.0	0.1
26	20	70.0	1.7
27	30	40.0	5.1
28	30	40.0	3.5
29	16	60.0	0.6
30	24	65.0	1.3
31	24	45.0	2.2
32	16	60.0	0.7
33	16	75.0	2.0
34	48	110.0	24.3
35	16	70.0	0.3
36	16	50.0	2.1
37	16	70.0	0.4
38	16	70.0	0.7
39	16	70.0	0.5
40	16	70.0	0.6
41	20	70.0	1.3
42	16	70.0	1.9
43	16 (Equiv.)	50.0	1.1
44	30	50.0	3.1
45	20	70.0	1.3
46	16	60.0	0.2
47	12	55.0	0.4
48	16	75.0	2.1
49	22 (Equiv.)	75.0	3.0
50	36	70.0	13.2
51	12	55.0	0.4
52	36	70.0	9.5
53	16	75.0	0.6
54	30	70.0	5.3
55	12	60.0	0.0
56	30	70.0	3.5
57	16	80.0	0.6
58	12	55.0	0.3
59	12	50.0	0.3
60	16	50.0	1.7
61	16	70.0	1.3
62	30	70.0	1.0
63	12	50.0	0.5
64	12	50.0	0.6
65	20	60.0	0.3
66	12	50.0	0.4
67	12	50.0	0.3
68	16	60.0	0.2
69	16	50.0	0.9
70	20	40.0	1.6
71	12	50.0	0.5
72	12	50.0	0.4
73	24	40.0	2.4
74	16	70.0	0.4
75	30	70.0	0.3
76	36	70.0	2.9
77	12	50.0	0.4
78	16	100.0	1.3
79	16	70.0	0.5
80	16	110.0	1.5
81	12	45.0	0.8
82	16	65.0	1.4
83	12	55.0	0.2
84	24	130.0	3.5
85	24	130.0	4.2
86	16	130.0	0.6
87	20	130.0	1.3
88	24	130.0	5.0
89	16	50.0	0.1
90	36	70.0	5.6
91	24	45.0	3.2
92	20	65.0	0.8
93	16	45.0	0.9
94	16	50.0	0.7
95	16	50.0	1.5
96	16	55.0	0.7
97	16	50.0	1.0
98	12	50.0	0.1
99	12	60.0	0.8
100	12	60.0	0.7
101	12	60.0	0.8
102	20	60.0	0.9
103	24	45.0	2.2

SOUTHERN HIGH SERVICE
STUDY DAY: THURSDAY, JUNE 23, 1966
PRESSURE HEAD CONTOURS, 11-AM TABLE SHS 11

BOSTON WATER

FIGURE-SHS 4

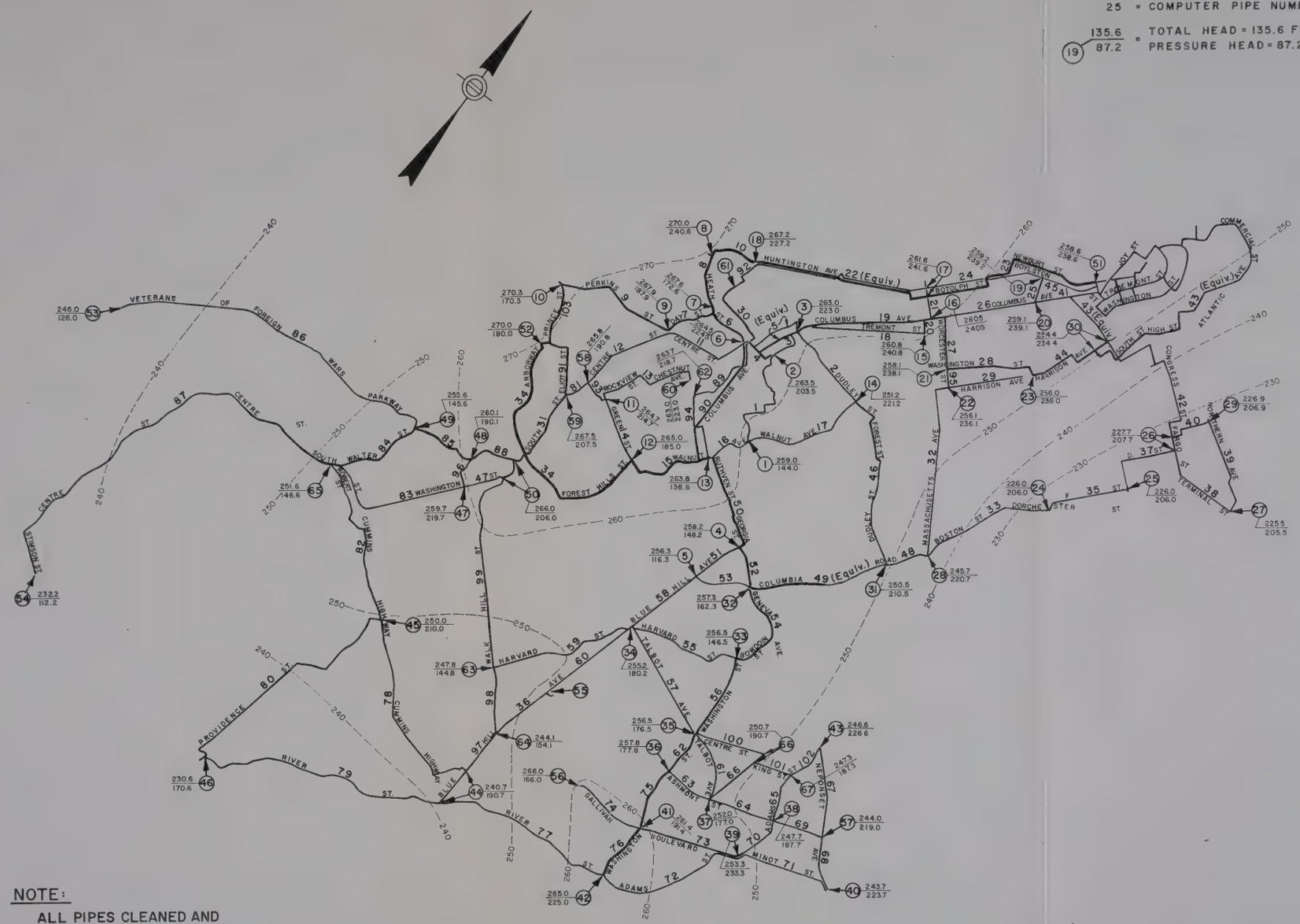
PIPE NUMBER	DIAMETER INCHES	HAZEN-WILLIAMS COEFFICIENT	PIPE DISCHARGE IN MGD
1	16	55.0	2.0
2	12	65.0	1.5
3	16	70.0	2.0
4	24	60.0	4.4
5	36 (Equiv.)	60.0	14.3
6	36	75.0	19.4
7	36	60.0	6.0
8	36	75.0	14.3
9	36	60.0	10.5
10	42	70.0	27.3
11	16	45.0	1.0
12	16	45.0	1.5
13	16	45.0	1.2
14	12	45.0	1.0
15	48	110.0	26.0
16	12	70.0	2.0
17	12	70.0	1.2
18	20	70.0	2.5
19	30	60.0	6.4
20	20	70.0	2.3
21	24	50.0	4.0
22	44 (Equiv.)	70.0	23.6
23	42	70.0	15.3
24	20	70.0	2.5
25	16	70.0	0.4
26	20	70.0	2.1
27	30	40.0	10.3
28	30	40.0	7.0
29	16	60.0	1.0
30	24	65.0	2.0
31	24	45.0	5.0
32	16	60.0	2.0
33	16	75.0	4.4
34	48	110.0	29.0
35	16	70.0	0.4
36	16	60.0	5.0
37	16	70.0	1.1
38	16	70.0	1.5
39	16	70.0	1.1
40	16	70.0	1.4
41	20	70.0	2.0
42	16	70.0	4.5
43	16 (Equiv.)	50.0	3.0
44	30	50.0	6.1
45	20	70.0	2.0
46	16	60.0	1.0
47	12	55.0	1.0
48	16	75.0	4.5
49	22 (Equiv.)	75.0	6.2
50	36	70.0	22.0
51	12	55.0	1.0
52	36	70.0	13.2
53	16	75.0	1.2
54	30	70.0	4.4
55	12	60.0	0.3
56	30	70.0	0.3
57	16	80.0	1.0
58	12	55.0	0.3
59	12	50.0	1.1
60	16	50.0	3.0
61	16	70.0	3.5
62	30	70.0	10.0
63	12	50.0	1.5
64	12	50.0	1.6
65	20	60.0	1.0
66	12	50.0	1.0
67	12	50.0	0.8
68	16	60.0	0.6
69	16	50.0	2.6
70	20	40.0	4.7
71	12	50.0	1.5
72	12	50.0	1.4
73	24	40.0	7.0
74	16	70.0	2.2
75	30	70.0	14.0
76	36	70.0	20.2
77	12	50.0	1.4
78	16	100.0	2.5
79	16	70.0	1.4
80	16	110.0	3.4
81	12	45.0	0.6
82	16	65.0	2.0
83	12	55.0	0.5
84	24	130.0	7.5
85	24	130.0	9.5
86	16	130.0	1.7
87	20	130.0	4.0
88	24	130.0	11.1
89	16	50.0	0.6
90	36	70.0	2.3
91	24	45.0	6.0
92	20	65.0	3.0
93	16	45.0	2.0
94	16	50.0	1.0
95	16	50.0	3.1
96	16	55.0	1.4
97	16	50.0	1.7
98	12	50.0	0.2
99	12	60.0	1.4
100	12	60.0	2.0
101	12	60.0	2.2
102	20	60.0	2.3
103	24	45.0	3.0

SOUTHERN HIGH SERVICE
STUDY DAY: YEAR 2020
TOTAL HEAD CONTOURS; TABLE-SHS25

BOSTON WATER

FIGURE—SHS 5

PIPE NUMBER	DIAMETER INCHES	PIPE DISCHARGE IN MGD
1	16	2.0
2	12	2.0
3	16	1.4
4	24	4.5
5	36 (Equiv.)	15.0
6	36	22.0
7	36	6.0
8	36	16.3
9	36	11.4
10	42	30.0
11	16	2.0
12	16	1.4
13	16	1.2
14	12	0.3
15	48	21.0
16	12	1.5
17	12	1.2
18	20	2.2
19	30	7.0
20	20	2.0
21	24	5.3
22	44 (Equiv.)	24.5
23	42	15.0
24	20	2.5
25	16	0.4
26	20	2.1
27	30	12.0
28	30	8.0
29	16	0.4
30	24	3.2
31	24	3.8
32	16	2.7
33	16	4.1
34	48	23.1
35	16	0.0
36	16	4.9
37	16	1.4
38	16	1.5
39	16	1.1
40	16	1.4
41	20	1.7
42	16	4.8
43	16 (Equiv.)	2.2
44	30	5.7
45	20	1.8
46	16	0.1
47	12	1.5
48	16	3.5
49	22 (Equiv.)	5.1
50	36	21.0
51	12	1.0
52	36	12.4
53	16	1.3
54	30	4.6
55	12	0.4
56	30	0.3
57	16	0.9
58	12	1.0
59	12	1.3
60	16	2.5
61	16	2.7
62	30	8.4
63	12	1.6
64	12	1.2
65	20	1.5
66	12	0.6
67	12	0.8
68	16	0.6
69	16	2.7
70	20	5.9
71	12	1.5
72	12	1.5
73	24	8.2
74	16	2.4
75	30	12.5
76	36	20.0
77	12	1.8
78	16	2.1
79	16	2.0
80	16	2.8
81	12	1.4
82	16	0.9
83	12	1.1
84	24	5.9
85	24	7.9
86	16	1.7
87	20	3.8
88	24	9.4
89	16	1.0
90	36	6.0
91	24	5.7
92	20	4.0
93	16	2.3
94	16	0.3
95	16	3.3
96	16	1.3
97	16	2.3
98	12	0.5
99	12	1.5
100	12	1.4
101	12	1.4
102	20	2.2
103	24	2.0



NOTE:
ALL PIPES CLEANED AND LINED WITH HAZEN-WILLIAMS C=135

SOUTHERN HIGH SERVICE
STUDY DAY: YEAR 2020
TOTAL HEAD CONTOURS; TABLE SHS26

FIGURE—SHS 6

TABLE SHS-63

SOUTHERN HIGH SERVICE

RECOMMENDED ORDER OF IMPROVEMENTS

					COST IN THOUSAND DOLLARS (1967)				
NO.	PIPE NO.	DIAMETER	LENGTH FEET	STREET LOCATION	CLEANING & LINING	CUMULATIVE CLEANING & LINING	VALVES FITTINGS	REPLACEMENT COST C.I.	REPLACEMENT COST CONC.
1	8	36	2400	Heath Street	24.0	24.0	8.0	189.0	180.0
2	30	24	2400	Fisher Ave.	24.0	48.0	3.0	95.3	87.5
3	62	30	1800	Washington St.	18.0	66.0	3.0	80.7	76.8
4	75	30	2400	Washington St.	24.0	90.0	3.0	108.0	102.0
5	76	36	2400	Washington St.	24.0	114.0	9.0	130.0	122.0
6	70	20	2080	Adams Street	20.8	134.8	2.0	74.4	66.6
7	65	20	1760	Adams Street	17.6	152.4	4.0	62.9	56.3
8	74	30	3000	Gallivan Blvd.	30.0	182.4	7.8	135.0	128.0
9	56	30	3400	Washington St.	34.0	216.4	3.0	152.0	145.0
10	57	16	4800	Talbot Avenue	48.0	264.4	2.5	140.0	126.0
11	55	12	4800	Harvard St.	48.0	312.4	4.4	107.0	97.4
12	92	20	1440	Parker Hill Ave.	14.4	326.8	2.0	83.2	77.8
13	67	12	3400	Neponset Ave.	34.0	360.8	2.0	75.5	69.0
14	102	20	1600	Adams Street	16.0	376.8	0.0	57.2	51.2
15	19	30	5400	Columbus Ave.	54.0	430.8	3.0	242.0	230.0
16	18	20	5120	Tremont St.	51.2	482.0	0.0	296.0	276.0
17	24	20	4500	Huntington Ave.	45.0	527.0	14.0	260.0	243.0
18	45	20	1700	Boylston Street	17.0	544.0	4.0	98.2	91.8
19	25	16	1000	Berkeley St.	10.0	554.0	3.4	29.1	26.3
20	21	24	1200	Massachusetts	12.0	566.0	9.0	78.7	74.8
21	26	20	3400	Columbus Ave.	34.0	600.0	10.0	122.0	109.0
22	41	20	1760	Columbus Ave.	17.6	617.6	6.0	102.0	95.0
23	43	16	3200	Commercial St.	32.0	649.6	13.0	160.0	151.0
24	44	30	3200	Harrison Ave.	32.0	681.6	6.0	144.0	136.0
25	11	16	3400	Centre Street	34.0	715.6	2.5	98.6	89.4
26	12	16	3700	Centre Street	37.0	752.6	4.4	108.0	97.3
27	81	12	800	Centre Street	8.0	760.6	24.0	17.8	16.2
28	103	24	2400	Prince Street	24.0	784.6	6.0	95.3	87.5
29	31	24	3000	South Street	30.0	814.6	9.0	119.0	109.0
30	91	24	2400	Eliot Street	24.0	838.6	3.0	95.3	87.5
31	29	16	3050	Harrison Ave.	30.5	869.1	4.4	152.0	144.0
32	28	30	3300	Washington St.	33.0	902.1	3.0	233.0	226.0
33	46	10	5000	Dudley Street	50.0	952.1	11.2	145.0	131.0
34	13	16	4400	Rockview St.	44.0	996.1	6.8	128.0	116.0
35	14	12	2600	Green Street	26.0	1022.1	1.6	57.7	52.8
36	93	16	800	Seaverns Ave.	8.0	1030.1	2.5	23.3	21.0
37	89	16	3200	Amory Street	32.0	1062.1	1.7	93.1	84.2
38	94	16	2400	School St.	24.0	1086.1	1.7	69.8	63.1
39	37	16	3050	D Street	30.5	1116.6	3.4	88.8	80.2
40	35	16	3050	F Street	30.5	1147.1	3.4	88.8	80.2

TABLE SHS-63

continued

COST IN THOUSAND DOLLARS (1967)

NO.	PIPE NO.	DIAMETER	LENGTH FEET	STREET LOCATION	CLEANING & LINING	CUMULATIVE CLEANING & LINING	VALVES FITTINGS	REPLACEMENT COST C.I.	REPLACEMENT COST CONC.
41	38	16	3300	Terminal St.	33.0	1180.1	3.4	96.0	86.8
42	32	16	5600	Mass. Ave.	56.0	1236.1	4.4	163.0	147.0
43	54	30	3300	Geneva Ave.	33.0	1269.1	6.0	148.0	141.0
44	52	36	1600	Geneva Ave.	16.0	1285.1	3.0	87.0	81.0
			END OF PHASE 1						
45	90	36	5000	Columbus Ave.	50.0	1335.1	9.0	394.0	352.0
46	6	36	1760	Heath Street	17.6	1352.7	0.0	95.9	89.5
47	7	36	1920	Day Street	19.2	1371.9	6.0	105.0	97.5
48	9	36	4700	Perkins Street	47.0	1418.9	9.0	256.0	238.0
49	50	36	3400	Ruthven Street	34.0	1452.9	3.0	185.0	174.0
50	33	16	4800	Boston Street	48.0	1500.9	3.4	238.0	223.0
51	42	16	4800	Congress St.	48.0	1548.9	6.8	238.0	223.0
52	23	42	7200	Newbury St.	72.0	1620.9	20.0	651.0	615.0
53	5	16	2000	Terrace St.	20.0	1640.9	11.4	99.5	92.6
			END OF PHASE 2						
54	79	16	9600	River Street	96.0	1736.9	20.0	280.0	250.0
55	77	12	6500	River Street	65.0	1801.9	20.0	132.0	132.0
56	97	16	2400	Blue Hill Ave.	24.0	1825.9	5.5	70.0	63.0
57	36	16	3000	Blue Hill Ave.	30.0	1855.9	3.3	88.0	76.0

Boston Water

CHAPTER HPFS

HIGH PRESSURE FIRE SERVICE

ABSTRACT: The HPFS, consisting of two pumping stations and approximately nineteen miles of unlined cast iron pipe, is used to fight fires in the congested high value district of Boston Proper. There may be advantages, in terms of more effective fire fighting at comparable cost, to modifying present methods of fighting fires in this area.

Charles A. Maguire and Associates

Boston Hartford Providence

CONCLUSIONS

The following conclusions were made:

1. The High Pressure Fire Service (HPFS) provides an effective means of fighting fires in the congested, high value district of the City.

2. The decision to retain, abandon or refurbish the HPFS can only be made after a comprehensive study of fire department operations and equipment. The water system is adequate for any foreseeable decision.

3. A range of alternatives between total dependence on the HPFS and total abandonment of the HPFS can be considered for fire fighting in the congested high value district. Modifications to the existing fire fighting equipment and changes in operating procedures may bring about significant improvements in fire fighting effectiveness at comparable or lower costs.

4. The Southern High Service (SHS) could be effectively used to replace the HPFS pumping stations if a comprehensive study of the Fire Department operations indicates a resulting increase in fire fighting effectiveness.

5 If the HPFS pumping stations are to be retained they should be fully automated.

6. The signaling equipment in the pumping stations is obsolete and in poor condition. It could be replaced with a modern, efficient, communications system which can be incorporated into the Fire Department's normal communication system.

7. If the Atlantic Avenue Station is to be retained for the indefinite future, efforts should be made to convert the power supply from DC to either AC or steam. An AC power supply would be the most economical conversion while a steam supply would be the most reliable.

8. The steam supply to the Kneeland Street Station will be available for the foreseeable future. This supply is independent from the normal electrical supply of the Edison Company and will operate in the event of a general, major power blackout.

9. Tests made by the National Board of Fire Underwriters (NBFU) in 1950 showed that pump performance in the Atlantic Avenue Station was below the rated capacity specified by the manufacturer, (Fig. HPFS 4.)

10. If it is found necessary to replace the existing pumps with new equipment, the replacement pumps should have a flatter head discharge characteristic and lower shut-off head than the present pumps.

11. The high pressures generated by the HPFS pumping stations are not utilized at all fires. Normal operating practice of the Fire Department requires throttling of hoses by using the gate valves on the special hydrants.

12. Discussions with Fire Department officials, engineers from other cities and inspection of fire fighting equipment indicates that an appreciable increase in effectiveness could be obtained by carefully designing fire fighting apparatus in line with modern engineering practices.

RECOMMENDATIONS

Based on the above conclusions the following recommendations were made:

1. The City should undertake a study of the need and use of the High Pressure Fire Service as part of the overall operations of the Fire Department.

2. The piping in the HPFS should be cleaned and lined as part of the overall rehabilitation program in the City.

3. The pumps and driving motors should be torn down by factory authorized mechanics to determine the amount of wear that has taken place since their installation and to estimate their remaining useful life.

4. The DC electrical equipment in the Atlantic Avenue Station should be replaced or repaired if this station is to be used in the future.

5. The instrumentation presently installed in the pumping stations should be repaired and put back into use. Records of pressure and discharge should be communicated to the Water Division on a regular basis.

INTRODUCTION

In addition to the four services which distribute normal consumptions throughout Boston there is a high pressure fire service (HPFS) in the high value district of Boston Proper. The HPFS System is normally under pressure from the Southern Low Service (SLS); higher pressures are obtained by pumping from either of two pumping stations taking suction from the SLS. Additional suction can be obtained from the Southern High Service (SHS). The Water Division of the Department of Public Works maintains the piping network while maintenance and operation of the pumping stations is the responsibility of the Fire Department. The system was first placed in service on December 19, 1921.

There are approximately 19 miles of unlined cast iron pipe in the HPFS. Approximately 6 miles of this pipe are 12-inch, nine miles are 16-inch, and 4 miles are 20-inch pipe. Forty-three hundred feet of 12-inch was installed in 1898; the remainder has been laid since 1912. The system was originally designed for 300 psi but the present operating procedure does not allow pressures higher than 200 psi. The Water Division reports very little trouble with these mains.

The two pumping stations each contain two centrifugal pumps with variable speed drives. On receipt of alarms, initially one pump develops a pressure of 150 psi. Additional pressure is provided on receipt of telegraphic signals, and on rare occasions the Water Division may request the normal maximum pressure be raised to 200 psi to test various sections of the distribution system. During 1950, the stations operated in response to 753 alarms for a total of 187 hours. Figure HPFS5 shows the history of energy use since 1953.

THE PUMPING STATIONS

Kneeland Street Pumping Station: This station is located in the Boston Edison Company Steam Plant at South Street. The two 10-inch, 3-stage double suction diffuser pumps furnished by the Worthington Corp. in 1921 were both rated at 3,000 gpm and 690 feet total head at 1165 rpm. At an acceptance test made on December 9, 1921, by the National Board of Fire Underwriters, pump 1 discharged 3,100 gpm at 301 psig, and 4676 gpm at 201 psig. Pump 2 discharged 3,114 gpm at 300 psig; 5,164 gpm at 209 psig and 7,400 gpm at 100 psig. The two pumps together discharge 6,580 gpm at 292 psig and 10,266 gpm at 201 psig. Since suction pressures were not specified in the records of the tests these points cannot be plotted on the characteristic curves of Figure HPFS4. Additional tests were made by the National Board of Fire Underwriters on November 2, 1950. During these tests the pumps delivered 4,420 gpm and 4,520 gpm against 198 and 203 psi discharge pressures with respective suction pressures of 43 and 41 psig. These points fall close the manufacturer's rating curve, Figure HPFS4. No other test data is available on these pumps.

The two 16-inch discharge mains extending from the pumping station to the high pressure fire distribution system are equipped with Venturi meters, now inopertive. These meters should be put in operating condition to facilitate checks of water requirements for fires and pump characteristic curves.

Emergency suction, presently disconnected, can be obtained from a 16-inch salt-water main from the Boston Harbor. A vacuum pump is necessary to prime the fire pumps when suction is taken from salt water. A 4-inch bypass equipped with check valves and a meter is provided between suction and discharge side of piping to insure the absence of air in the system and to provide means of measuring the leakage in the high pressure fire distribution system.

The pressure in the HPFS is controlled by regulating the speed of the steam turbines with hand-operated steam valves. An adequate supply of steam of suitable quality is available from the Boston Edison Company. At the present time, (1967) the steam marketing division of the Edison Company is undergoing an expansive sales program and discussions with Edison officials indicate that steam will continue to be available for the foreseeable future.

The rotating machinery in the plant appears to be well maintained and in good condition. Additional field tests are necessary to determine the extent of maintenance which may be desireable. The signaling system and some of the valves on the steam lines are presently in poor condition.

Atlantic Avenue Station: This station has two 10-inch, 4-stage, single suction diffuser pumps. These pumps were originally rated at 3000 gpm, 690 feet total head at 1,000 rpm. They are both driven by 750 horse-power D. C. motors and may be operated over a range of speed. Power to the D. C. motors is supplied by rotary converters in the Boston Edison Company D. C. sub-station nearby. Tests made by the National Board of Fire Underwriters in 1921 gave the following results: Pump 1 discharged 3,141 gpm at 298 psig and 4,413 gpm at 202 psig. Pump 2 discharged 3,000 gpm at 300 psig and 4,407 gpm at 200 psig. The two pumps operating together discharged 6,580 gpm at 292 psig. Like the tests made in the Kneeland Street Station this data is inadequate for checking the characteristic curve specified by the manufacturer. Additional tests were made by the NBFU in 1950. At these tests the pumps delivered 3,940 gpm and 3,740 gpm against 188 and 206 psig with suction pressures of 54 and 56 psig respectively. These points fall well below the rated performance and suggest that the pumps should be properly checked by factory mechanics.

Two 16-inch suction lines which can supply either pump extend from a 16-inch SLS main in Atlantic Avenue. An additional 12-inch suction connection to the SHS is normally closed and an emergency salt water supply with maximum lift of 15 feet is provided by a 16-inch line about 20 feet long extending from

the suction header to a 12 x 14 foot wooden tunnel from the Harbor. A flanged section of the 16-inch main has been removed and is kept in the station. Electric driven vacuum pumps are necessary for priming the salt water suction line. Two 16-inch discharge mains, each equipped with a Venturi meter, lead to separate 20-inch mains in Atlantic Avenue. The Venturi meters are presently inoperative, as are the recording pressure gauges in the station. Regulating valves are installed between discharge and suction lines at each pump and the pressure is controlled at an operating board from which the station valves are electrically operated.

Electric power is purchased from the Boston Edison Company. A single circuit enters underground from the nearby substation where there are rotary converters to convert AC current to DC and two storage batteries with a rated combined capacity of 6,330 ampere-hours. These batteries operate as part of the Edison DC-grid and are totally inadequate to supply power to the HPFS pumps if the major electrical system fails. (The HPFS load represents less than 1-percent of the total load on the Edison DC-grid).

The Boston Edison Company is not presently advocating the sale of additional DC power. In Boston, as elsewhere in the United States, the market for DC power is not active.

The rotating machinery in this pumping station appears to be in fair condition although the 1950 pump tests indicate that a complete tear-down of the machinery would be necessary to accurately assess its remaining useful life. The switchgear and electrical supply cables appear to be in poor condition and considering the lack of commercial interest in maintaining DC power supply, efforts should be made in the near future to replace the DC equipment entirely.

HYDRANTS AND VALVES

There are approximately 505 hydrants on the HPFS, (Fig. HPFS1). These are a special post type, opening against pressure, with a 6-1/8 inch valve opening on an 8-inch gated connection to the main. Each hydrant has four, 2-1/2 inch outlets with an independent gate on each. The hydrants are spaced at an average distance of 165 feet along the mains and are used only for fire fighting. Because of the high pressures and the independently gated outlets, these hydrants are considerably more expensive than those used in other areas of the City.

Valves may be operated so that in general no more than three hydrants would be affected by a single broken main. The average length of main between valves is approximately 450 feet. The valves are a solid wedge type, bronze mounted, and are set in brick vaults with markers on nearby walls.

UTILIZATION

Discussion with Fire Department officials indicates that while as much water as possible would be desirable at the site of a fire, it is generally impractical to utilize more than approximately 12,000 gpm. It was also found that nozzle pressures in excess of 50 psig cannot be used in hand held lines. Deck guns mounted on mobile equipment require nozzle pressures of approximately 80 to 100 psi.

A computer analysis of the HPFS network indicates moderate hydraulic losses under maximum flow conditions (Figs. HPFS2 and HPFS3); as a result, the 150 psi pressure developed by the pumping stations is generally greater than that required for fire fighting. During a fire, Fire Department personnel use the valves on the hydrants to reduce the nozzle pressure to a useable maximum. In extremely unusual circumstances, requiring the use of long fire hoses leading from hydrants, it has been necessary to operate the pumping stations to produce pressures as high as 200 psi. It is important to note that the hydraulic losses within the high pressure fire service distribution system are not great and that operating the pumps at higher pressures essentially pressurizes the entire HPFS and provides energy to overcome losses in hose lines.

RELIABILITY

An essential difference between the use of mobile fire fighting equipment and fixed major pumping stations lies in the relative reliability of the two modes of fire fighting. Numerous pieces of mobile equipment are not dependent upon a single source of power supply for their effective operation. In the event of a major power failure the DC powered pumps in the Atlantic Avenue Pumping Station would be solely dependent upon the inadequate batteries presently housed in the Chauncy Street DC substation of the Boston Edison Company. These batteries are not sufficient to supply the total demand of the interconnected DC grid during periods of high power consumption. The Steam powered pumps in the Kneeland Street Station would, however, operate during a power blackout. The Boston Edison Company has sufficient stand-by diesel generating equipment to supply power to the automatic controls of the steam plant and no interruption in the delivery of steam would occur during a major blackout. It is evident that approximately 1/2 of the pumping capacity of the high pressure fire service would be lost during a major power failure. By way of contrast, the pumping capabilities of the mobile equipment of the Fire Department would not be impaired by a power blackout. The basic water supply to Boston is gravity operated and is independent of electrical power supplies.

An additional factor affecting the reliability of HPFS is the age and reduced carrying capacity of the pipes in the HPFS grid. At the present time (1967) the HPFS is not normally operated at pressures higher than 200 psig because the resultant pressure at the end of fire hoses cannot be manually controlled. Unless the pipes are cleaned and cement-lined, their hydraulic capacity will further deteriorate because of tuberculation.

BENEFITS AND COSTS OF THE HPFS

The function of the HPFS is to provide the Fire Department with an efficient tool for fighting fires. The value of the HPFS is not nearly as intangible or as difficult to measure as the value of the normal domestic water supply system. While there is no reasonable alternative to the domestic system, there are alternatives to the HPFS which can yield comparable fire fighting capabilities at various costs. These alternatives can be evaluated in the light of their cost and their relative effectiveness in fighting fire.

The costs associated with maintaining and operating the existing HPFS include charges for power, steam, rental of station, maintenance of equipment, and salaries of operating personnel. Additional charges may be made for maintaining the HPFS pipe network and hydrants. It is important to realize that these expenditures represent a choice on the part of the City to expend money on the HPFS rather than to invest an equal amount in the purchase of new mobile equipment.

There is no doubt that the existing HPFS provides an effective tool for fighting fires in the Central Business District. If this capability is to be maintained in the future, it will be necessary to replace the existing DC power supply and switchgear with either new DC equipment or an alternative source of power for the pumps in the Atlantic Avenue station. Additional capital investment is required to replace the presently inadequate and obsolete signaling equipment in both of the pumping stations. Sometime within the design period of this study (to the year 2020) it will be necessary to replace not only the drives but the pumps as well. All of these new capital items will add to the annual cost of the HPFS.

The present study indicated that the lowest annual operating cost for the high pressure fire service could be achieved with a fully automated or semi-automated mode of operating the pumping stations. To do this effectively, the existing signal system would have to be brought up to the standard of the

modern wireless communications channels of the mobile pumping units. It would be advantageous to treat the communication system for the high pressure fire service pumping stations as another link in the normal communication systems of the Fire Department.

The benefits derived from the fire fighting capabilities of the high pressure service can best be evaluated as part of a special comprehensive study of the operation of the Fire Department. The trunk main system of the City is adequate for any foreseeable large demands made by the HPFS. The requirements for water consumption in the area served by HPFS are significantly greater than any fire flow which the Fire Department could effectively utilize. The retention, expansion, improvement or abandoning of the HPFS would have little effect on the operation or plans for improvement to the water distribution system. It is clear, therefore, that the HPFS can be evaluated solely as a means of fighting fires and not as an integral part of the normal domestic water supply system of Boston.

THE SPECTRUM OF ALTERNATIVES

It is beyond the scope of the present report to investigate the operation of the Fire Department. However, it is pertinent to point out the broad range of possibilities which are presented for fighting fires in the congested central business district. A continuous sprectrum of alternatives between retention of the present method of fire fighting and total abandonment of the pumping stations can be considered. A comprehensive study of the Fire Department operations would be necessary to select the more desirable point in this spectrum.

When improved, the SHS will be capable of providing pressures for normal fire fighting requirements with hand-held lines. If the HPFS were not available, it may be desirable to install pumping equipment in existing ladder trucks and other pieces of fire fighting equipment on which deck guns are mounted and which do not presently contain their own booster pumping capabilities. Thus, if only the SHS were available for fire fighting in the congested value district, different types of equipment and altered fire fighting procedures would be necessary to provide fire fighting capabilities as good or better than existing.

The present operating budget for the HPFS is appreciable compared to the average annual expenditure of the Fire Department for new equipment. Since the equipment in the Central Business District is in need of replacement, it may

be possible to increase fire fighting capabilities by reallocating funds within the Fire Department. This reallocation could be done gradually; as the HPFS grows less effective with time, the diversity and capabilities of the mobile equipment can increase in effectiveness.

It is important to recognize that the high pressures produced by the HPFS cannot be utilized effectively with hand held lines of normal length. The principal uses of the high pressures are for the operation of deck guns which are mounted on mobile equipment (which could contain their own pumping apparatus if desired) and to provide additional pressure for unusual cases when exceptionally long hand held lines are required.

At this point it is useful to introduce some figures into the discussion. The average annual expenditure of the Fire Department for new equipment over the past five years was approximately $350,000. This may be compared to the annual operating expense of the HPFS of $104,000, not including the cost of maintaining the HPFS hydrants and piping system. Additional capital expenditures are required immediately for the purchase of new HPFS hydrants (which are of a special type not used elsewhere in the City), the rehabilitation of the signal system or its replacement with a more modern system, and the conversion of the obsolete DC electrical power supply to AC. The additional annual expenditure expected as a result of these major maintenance items for the HPFS is estimated to be approximately $50,000. It is seen that, compared to the average annual expenditure for new equipment in the entire City, the HPFS budget represents a major sum.

It should be clear that there is sufficient motivation here for the City to undertake a comprehensive study of the need and use of the HPFS. The question to be posed is not whether to abandon or retain the HPFS. Rather it is how to maintain or increase the fire fighting capabilities in the Central Business District in an economical way. The facts are: The existing pumping stations are in need of major repairs to their equipment, the high pressures generated by the pumping stations are not needed at all fires, the SHS could provide adequate pressures and discharges for hand held lines, hydraulic losses in the HPFS piping are small and it could be effectively incorporated into the SHS grid. The existing method of fighting fires in the congested value district has proven to be effective in the past. A study should be made to guarantee that it will continue to be effective in the future.

HIGH PRESSURE FIRE SERVICE
HYDRANT LOCATIONS

FIGURE—HPFS I

PIPE NUMBER	DISCHARGE IN MGD	PIPE NUMBER	DISCHARGE IN MGD
1	0.4	91	1.0
2	0.3	92	0.3
3	0.5	93	2.5
4	0.2	94	1.3
5	1.0	95	0.3
6	0.1	96	0.5
7	0.4	97	0.4
8	1.3	98	0.4
9	0.3	99	1.0
10	1.0	100	1.3
11	2.0	101	0.5
12	1.0	102	1.0
13	3.7	103	0.5
14	2.0	104	1.0
15	1.0	105	0.5
16	1.3	106	1.0
17	3.1	107	1.0
18	1.0	108	2.0
19	3.0	109	1.7
20	4.0	110	0.2
21	3.3	111	3.3
22	2.0	112	2.2
23	3.0	113	1.0
24	2.7	114	1.0
25	2.2	115	3.3
26	1.0	116	5.0
27	1.1	117	0.3
28	2.0	118	0.6
29	1.0	119	1.0
30	1.6	120	3.0
31	2.5	121	2.0
32	1.3	122	0.2
33	3.7	123	3.0
34	4.0	124	3.5
35	1.5		
36	2.2		
37	1.5		
38	1.0		
39	1.0		
40	2.2		
41	0.2		
42	1.0		
43	1.0		
44	1.4		
45	2.4		
46	4.4		
47	1.0		
48	1.0		
49	5.0		
50	5.4		
51	2.2		
52	1.0		
53	1.3		
54	4.8		
55	3.5		
56	2.1		
57	2.0		
58	2.0		
59	0.3		
60	1.6		
61	1.0		
62	1.2		
63	1.0		
64	3.2		
65	4.0		
66	1.0		
67	2.8		
68	1.7		
69	0.3		
70	2.5		
71	2.3		
72	1.0		
73	1.2		
74	1.1		
75	0.1		
76	1.5		
77	1.4		
78	2.0		
79	3.2		
80	3.3		
81	2.5		
82	7.0		
83	5.2		
84	1.0		
85	1.0		
86	3.5		
87	4.1		
88	3.3		
89	0.3		
90	0.5		

—LEGEND—

(60) = COMPUTER NODE POINT

48—16" = COMPUTER PIPE NUMBER 48, 16-INCH DIAMETER PIPE

(22) 340.8 / 290.8 = TOTAL HEAD = 340.8 FEET. PRESSURE HEAD = 290.8 FEET.

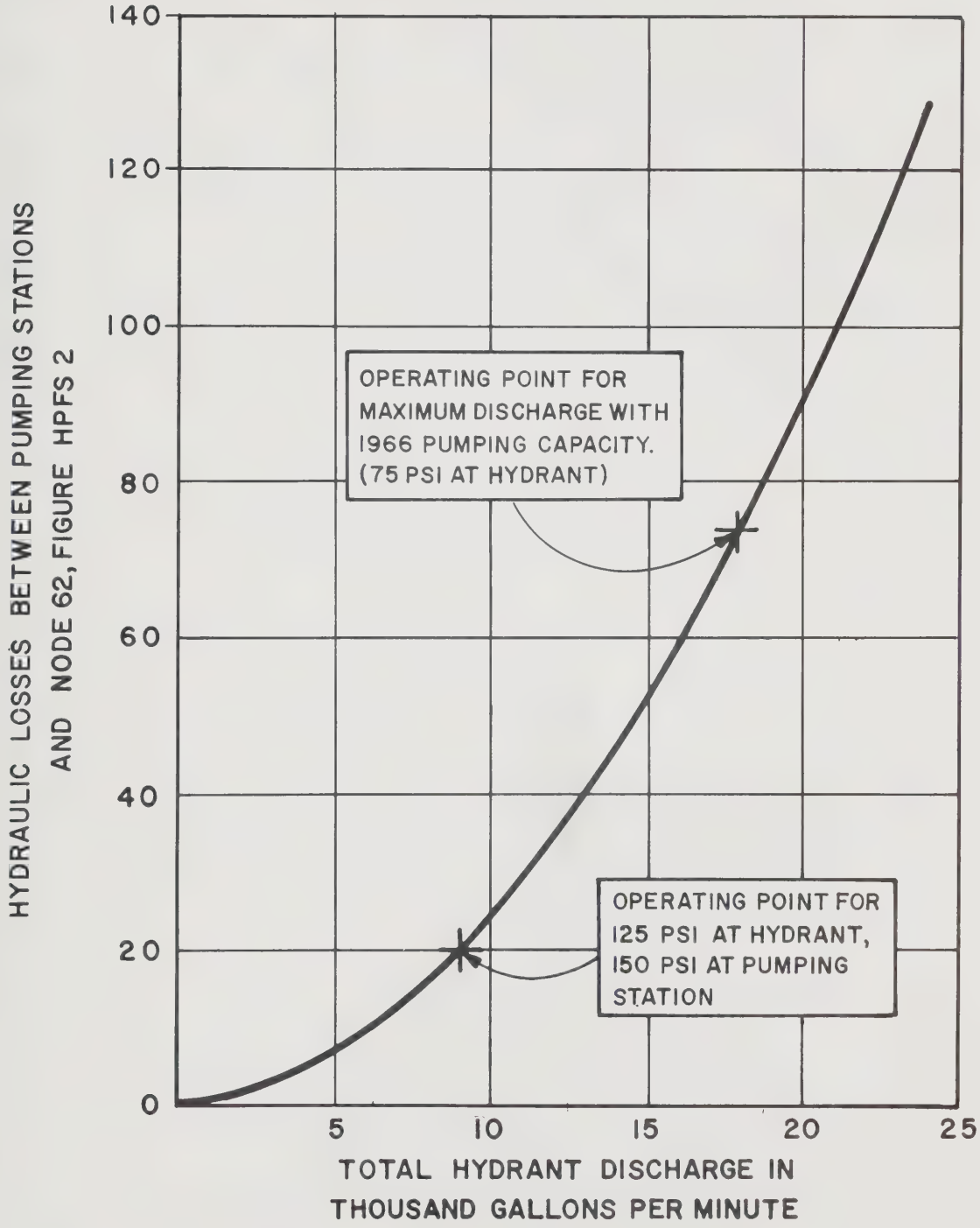
NOTES:

1. ALL PIPES, HAZEN-WILLIAMS COEFFICIENT = 65
2. PUMPING STATION AT NODE 11 DISCHARGING 5370 GPM
3. PUMPING STATION AT NODE 8 DISCHARGING 4350 GPM
4. HYDRANT DISCHAGES NEAR NODE 62 = 9720 GPM

HIGH PRESSURE FIRE SERVICE

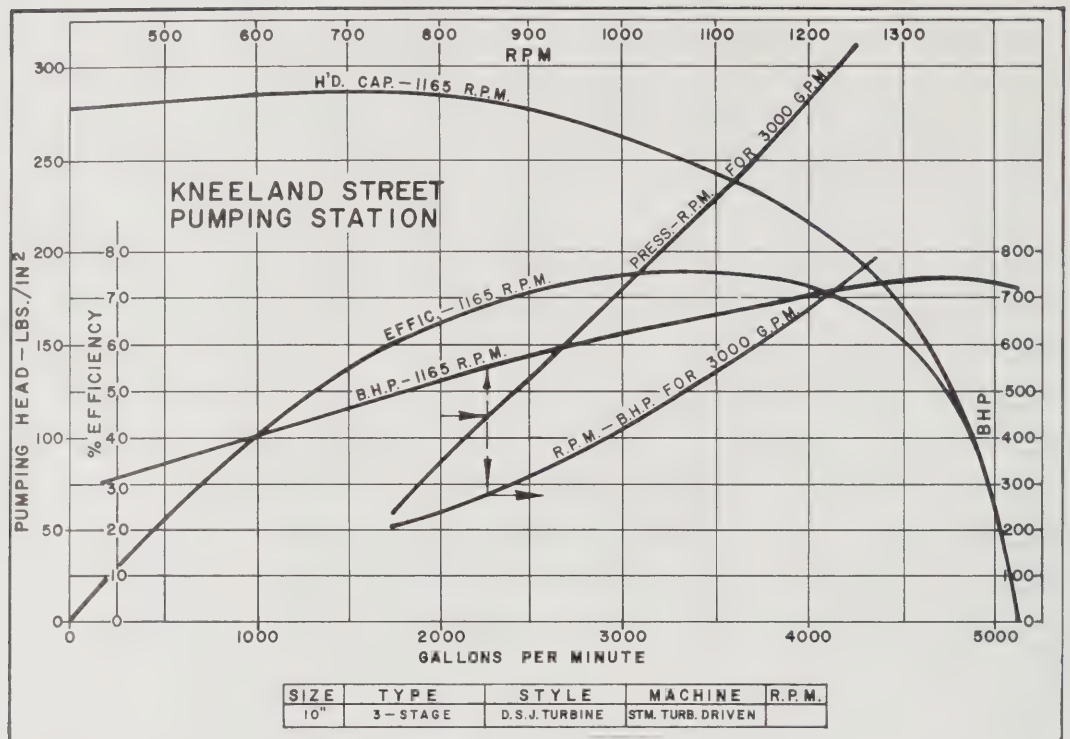
1966 OPERATION

TOTAL HEAD CONTOURS TABLE - HPFS1

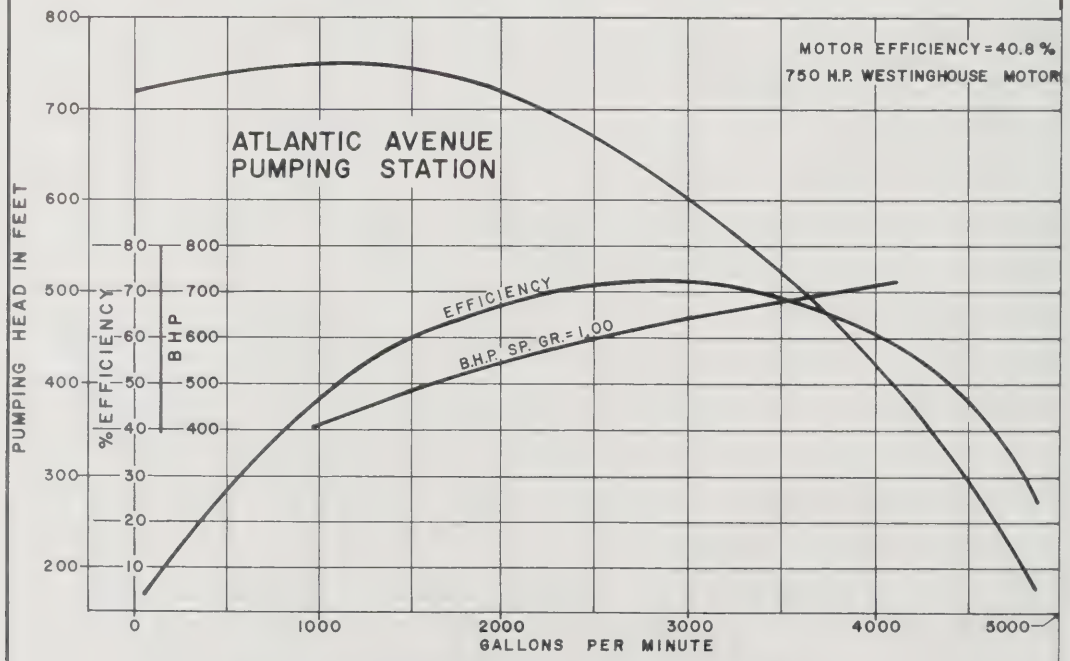


HIGH PRESSURE FIRE SERVICE
PIPING SYSTEM CHARACTERISTICS
(HAZEN – WILLIAMS C=65 FOR ALL PIPES)

BOSTON WATER FIGURE – HPFS 3



SIZE	TYPE	STYLE	MACHINE	R.P.M.
10"	3 – STAGE	D.S.J. TURBINE	STM. TURB. DRIVEN	

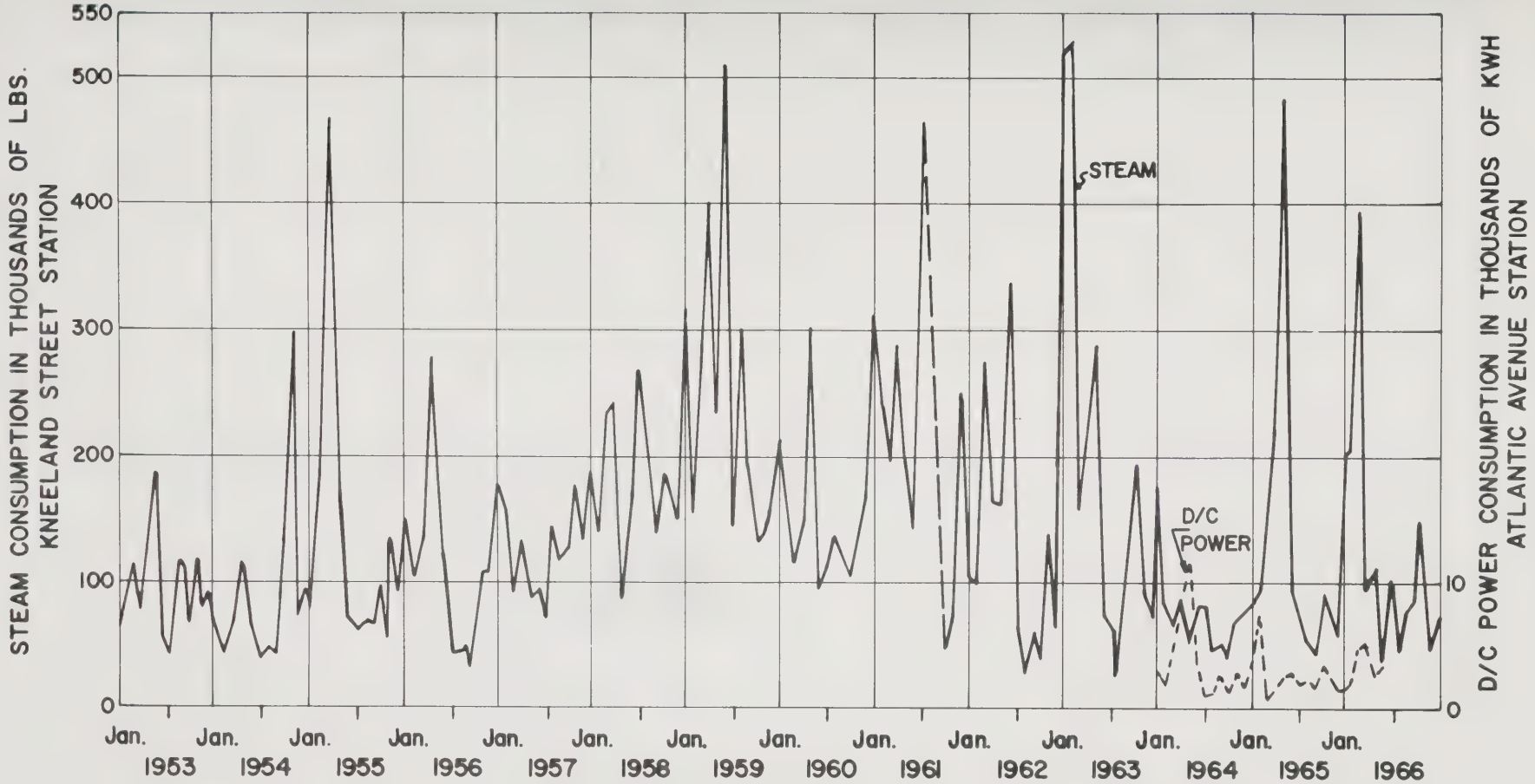


SIZE	TYPE	STYLE	MACHINE	R.P.M.
10"	4 – STAGE	SPEC. TURBINE	S.S.	1000

—HIGH PRESSURE FIRE SERVICE PUMP CURVES—

BOSTON WATER

FIGURE—HPFS 4



HIGH PRESSURE FIRE SERVICE
PAST USAGE OF STEAM & D/C POWER

BOSTON WATER

FIGURE HPFS-5

Boston Water

CHAPTER PH

THE PARKER HILL AREA

ABSTRACT: A comprehensive study was made to determine the reasons for and significance of low pressures on Parker Hill. It was found that the low pressures result from excessive losses in the MDC system. Future improvements to the MDC system will moderately increase pressures to a minimum of 20 psig on Parker Hill. Individual pumping stations will continue to be required to supply domestic pressure levels at higher elevations. The Parker Hill grid is adequate to supply anticipated maximum fire demands for water.

Charles A. Maguire & Associates

Boston Hartford Providence

CONCLUSIONS AND RECOMMENDATIONS

1. Low pressures on Parker Hill result from (a) the high elevation of the hill and (b) the low total head available in the MDC trunk mains which supply the hill, (page 105).

2. The large daily pressure variation at Parker Hill results from the excessively large hydraulic losses in the MDC system, (page 105 and Figure PH4).

3. Improvements to the MDC system early in 1967 should result in a minimum total head of approximately 238 feet and a normal minimum pressure at the highest street elevations of approximately 8 to 10 psig on Parker Hill, (page 105).

4. Improvements to the MDC system after 1970 should result in a minimum total head of approximately 265 feet, and a normal minimum pressure at the highest street elevations of approximately 20 psig on Parker Hill (page 106).

5. Improvements to the MDC system will raise normal pressures on Parker Hill but near the summit the pressure will still be somewhat less than that recommended for domestic supply. In view of the small area affected by these low pressures it is recommended that all new construction with flow levels above elevation 180 feet be supplied with self-contained pumping units to boost pressures for normal consumption. Buildings at lower elevation having automatic sprinklers or special requirements for higher pressures will also require booster pumps.

6. A permanent pressure recording instrument should be connected directly to either the 24-inch main in Fisher Avenue or the 20-inch main in Wait Street. Records obtained by this instrument will be valuable for designing pumping facilities for buildings and for planning future long range improvements to the Parker Hill grid system.

7. The large trunk mains serving the summit of Parker Hill provide ample capacity for fire fighting. These mains should be cleaned and cement-lined as part of the overall program for improvements to the Southern High Service.

INTRODUCTION

Parker Hill is an area of approximately 300 acres in the West Roxbury section of the City of Boston,(Figure PH1). The summit of the hill is at approximately elevation 220 ft. and two rather important fire hydrants are at approximately elevation 200 ft., Figure PH2. The area is supplied with water from the adjacent Boston Southern High Service trunk mains in Huntington Avenue and Heath Street, which in turn are primarily fed by the 48-inch MDC main in Boylston Street, Figure PH3. The total head available in these Boston High Service trunk mains varies between elevation 240 feet and 225 feet depending on the total demand in the Southern High Service, (Figure PH4). On hot summer days, when the total demand is high, the low total head available, coupled with the high elevation can result in a low pressure of approximately 5 to 8 psig at the highest hydrant and lower pressures on the upper floors of residences near the summit of Parker Hill.

The purposes of this study are to determine the causes of low pressure on Parker Hill, the amount of water which is available for fire fighting near the summit, the effects of large hydrant discharges on the domestic supplies to nearby residences, the improvements which will result from proposed modifications to the Metropolitan District Commission (MDC) main supply system to the City of Boston, and the desirable alterations and improvements to the grid system in the Parker Hill area. These purposes were fulfilled through an extensive computer-aided analysis, by consultation with officials of the MDC, the City of Boston and the hospitals located near the summit, and with reference to field hydrant discharge and pressure measurements taken on Parker Hill.

PHYSICAL CHARACTERISTICS OF THE NETWORK

Most of the pipes in the Parker Hill grid are smaller than 12-inches in diameter. However, at one time there was a water storage reservoir on the summit which was connected to the Heath Street and Huntington Avenue mains by a 20-inch main in Wait Street and a 24-inch main in Fisher Avenue, (Figure PH3). While the reservoir no longer exists, the 20-inch and 24-inch mains still remain to provide the capacity for carrying large discharges to the summit with low overall friction losses.

For the purposes of computer analysis, it was desirable, although not essential to simplify the network by omitting most 6-inch and 8-inch pipes which were of secondary importance. The figures presented with this report show all known existing pipes. Those pipes which were used in the analysis are numbered on Figures PH3 and PH5 and listed in the computer output tables, PH1 through PH15.

The low overall hydraulic losses in the Parker Hill network, resulting from the large pipes and low discharges, made accurate determination of pipe friction coefficients unnecessary. Based on coefficients measured in other areas of Boston, a conservative Hazen-Williams coefficient (C) of 65 was assumed for all pipes in the Parker Hill grid. Subsequently, a computer run using C = 130 for principal mains verified this assumption, (Table PH4).

WATER CONSUMPTION ON PARKER HILL

The water distribution system of the City of Boston can be characterized by a network of large capacity trunk mains serving many local areas. In each local area there is a secondary grid of smaller pipes. A comparison of the two types of networks has shown that fire flows to local areas impose a minor additional load on the trunk main grid. Conversely, in the local grids, the discharge necessary to effectively fight a medium sized fire, may be two or three times greater than the discharge which the local grid normally carries. Hence, for studies of emergency water supply conditions to a small area such as Parker Hill, it is not essential to have an exceptionally accurate knowledge of domestic and other normal water demands.

The average normal water demand of the Parker Hill area was estimated using a land use map, aerial photos and personal inspection of the facilities of major water users. Based on studies of water consumption in Boston, an average domestic water consumption of 114 gallons per capita per day was applied to estimate the level of demand on Parker Hill. The sensitivity of the network to errors in estimated demands was determined by comparing a computer analysis of the average demand to an analysis of the network under a demand rate three times the average maximum hourly consumption. The results showed a maximum hydraulic loss of 1 foot for the average demand and 2 feet at the same location for the larger demand Tables PH8, PH12. Figure PH3 shows total heads, pressure heads and discharges in the principal pipes of the network for the larger demand rate. It was concluded that normal demands have very little noticeable affect on the delivery pressure to users.

The principal water users on Parker Hill are the New England Baptist Hospital (0.6 million gallons per day maximum hourly consumption), and the Robert B. Brigham Hospital (0.1 MGD maximum hourly consumption). The remaining users in the area consume approximately 2.75 MGD during a peak hour. The total Parker Hill consumption during a peak hour (3.45 MGD) represents an insignificant increase in discharge in the nearby 48-inch MDC supply main which carries approximately 25 MGD during a peak hour to the 36-inch and 42-inch Boston trunk mains in Heath Street and Huntington Avenue. Hence the pressure at the principal inputs to Parker Hill is essentially independent of the consumption on the hill.

Further increases in consumption are foreseen as the medical facilities in the area expand and as present vacant land and older residential areas are converted to higher density residential areas. The average daily demand in the Parker Hill area may double in the future. Most of this additional demand will be adequately supplied from mains in Heath Street, Fisher Avenue near Bucknam Street, and Parker Hill Avenue near Huntington Avenue.

REASONS FOR LOW PRESSURE ON PARKER HILL

Parker Hill is approximately three (3) miles from the nearest area of similar high elevation. Past efforts to supply water to Parker Hill from the Southern High Service have provided marginally adequate pressures. In recent years there has been a considerable increase in the total demand on the overall MDC water distribution system and coupled with a normal deterioration in the hydraulic capacity of the supply pipes, the delivery pressure at Boston has been reduced so that it is no longer marginally acceptable at higher elevations on Parker Hill.

It is important to emphasize that the capacity of the internal grid system serving Parker Hill is more than adequate to meet normal and emergency demands for water. The reasons for the low pressures on the hill are (a), the high elevation of the hill and (b), the low total head available in the MDC trunk mains which supply the hill.

The measured hourly pressure variation on August 10 and 11, 1966, near the intersection of Huntington and South Huntington Avenue, is shown in Figure PH4. This pressure variation results from the variation in demand of the City of Boston and the low Hazen-Williams "C" of the 48-inch MDC main.

The upper half of Figure PH4 shows that much of the energy loss occurs between MDC meter station 5 and the Parker Hill connections to the Huntington Avenue and Heath Street trunk mains. The broken line indicates these hydraulic losses and suggests that the two curves would closely coincide if losses between the MDC pumping station at Chestnut Hill and MDC meter 5 were added to the broken curve.

ANTICIPATED HIGHER PRESSURES

The MDC water division is actively pursuing a program to update and improve the water supply to the City of Boston. Early in 1967 an

increase in reservoir elevations in the MDC system should result in a pressure head increase of approximately 8 feet in the Parker Hill area. Further in the future, circa 1970-72, a new 10-foot diameter aqueduct connecting with the Boston Southern High Service near Morton Street and American Legion Highway will radically change the distribution of flows within the City of Boston network. As a result of the changed distribution and the ability to maintain a high, constant pressure at the new Morton Street connection, the total head throughout the Southern High Service will be maintained uniformly throughout the day at approximately elevation 265 or 270 feet. This improvement will increase the minimum pressure head on Parker Hill to approximately 45 feet (20 psi). Additional improvements may be gained by changing the present mode of operation of the entire Southern High Service. This possibility is discussed in another section of this report.

SIGNIFICANCE OF ANTICIPATED HIGHER PRESSURES

Normal water works practice calls for minimum pressures of 60 to 75 psig for buildings having automatic sprinklers for fire fighting and approximately 40 psig for residential use. It is therefore apparent that individual pumping plants will continue to be desirable for commercial buildings with upper floors above approximately elevation 110 feet and for apartments above elevation 180 feet. Near the summit of Parker Hill, with the advent of the new Morton Street aqueduct, individual residents will experience a considerable increase in pressure that will still, however, fail to be entirely satisfactory according to standard practice. Considering the past history of extremely low water pressures in the area, a minimum pressure of 20 psig at elevation 220 should, however, be acceptable to local residents.

A preliminary study was made to determine the feasibility and cost of providing higher pressures at the summit. It was found that portions of the network above elevation 180 feet could be pressurized to supply normal domestic demands by utilizing a small pumping station and check valves located in pertinent pipes. The check valves would permit high flows at lower pressures to enter the quasi-isolated system when emergency conditions occur. The cost of installing and operating a quasi-isolated system would be approximately $25,000.00 and $3,000.00 per year respectively. Considering the forthcoming improvements to the MDC system and the small number of domestic users which are presently affected, this expenditure is not considered to be justified. However, this alternative should be periodically reviewed as land usage and water supply needs on Parker Hill change in the future.

A permanent recording pressure instrument should be installed at Parker Hill to provide data for continuing evaluation of pressure conditions and for use in designing pumping facilities for individual buildings and for planning improvements to the grid system. This instrument need not be located near the summit but should have a direct connection to either the 24-inch main in Fisher Avenue or the 20-inch main in Wait Street.

HYDRANT DISCHARGES AND GRID OPERATION

In most locations, and particularly near the summit of Parker Hill, it is impractical to utilize unpumped hydrant discharges for fire fighting. Hence, a study of the Parker Hill grid capabilities in emergency conditions must include cognizance of the capabilities and limitations of mobile pumper units.

Prior to 1967 on Parker Hill, the minimum main pressure in emergency conditions could fall as low as approximately 3 psig. It was therefore necessary to carefully evaluate how the grid, hydrants and pumpers would operate during an emergency. It was appreciated that standard practice calls for a minimum hydrant pressure of 20 psig. However, since preliminary calculations showed the excellent capabilities of the Parker Hill grid to supply large quantities of water at very low pressures, Table PH1, PH2, it was deemed important to determine if the present system could be considered adequate without meeting the standard minimum 20 psig pressure requirement.

The Boston Fire Department has many mobile pumpers which can pump approximately 750 gallons per minute (gpm) against a maximum discharge pressure of 250 pounds per square inch (psig). Additional larger pumpers rated at 1,000 gpm are available and could be used on Parker Hill if required. Figure PH6 shows a practical range of hydrant rating curves and the corresponding range of pumper discharges from a 2-stage, 750 gpm mobile pumper. The curves show that more than 500 gpm can be obtained from a pumped hydrant with zero gauge pressure on the upstream side of the hydrant (i.e., in the main) and quite possibly as much as 650 gpm could be obtained. In order to utilize the full pumper capacity of 750 gpm a minimum main pressure of approximately 7½ psig is required. If the pressure in the main falls below zero gauge pressure there is a very rapid decrease in pumper discharge.

FIELD HYDRANT DISCHARGE MEASUREMENTS

In October, 1965 hydrant discharge measurements were made by the Pitometer Associates of New York. The measurements utilized a hydrant pitot tube and static pressure gauges and involved operation of 6 hydrants near the summit

of Parker Hill. The maximum discharge measured was 580 gpm with a static pressure in the main of approximately 19 psig. The resulting hydrant losses of approximately 6 psi at 580 gpm are consistent with the theoretically derived hydrant loss curve of Figure PH6.

During the hydrant discharge tests, static pressures were measured at nearby hydrants. The measured ½ psi decrease in static pressure at 580 gpm hydrant discharge compares favorably in general with the results of the computer analysis of hydrant discharges and demonstrates the strength of the grid system on Parker Hill.

RESULTS OF COMPUTER ANALYSIS

Tables PH1 through PH 15 present the detailed computer output for all conditions analyzed. Pipe and node numbers are shown on Figures PH3 and PH5 along with selected results.

Total Hydrant Discharge at 10 psig - Table PH1: This was a preliminary run to assess the general performance of the grid and to determine the total hydrant discharges available near the summit at a pressure of 10 psig. The total head in Huntington Avenue at node 1 was 241.0 feet and the corresponding total head in Heath Street at Parker Street at nodes 8 and 9 was assumed to be 240.0 feet. The run showed that if adequate hydrant capacity was available a total discharge of 3,960 gpm could be obtained at a main pressure of 10 psig (23.0 feet) with average consumptions elsewhere in the grid.

Effect of Small Total Head Variations - Table PH2: This was a preliminary run to assess the effects of a small change in total head on the maximum total hydrant discharge available at 10 psig near the summit. A total head of 240.5 feet in Huntington Avenue at node 1 was assumed. The resulting total hydrant discharge near the summit of 3,880 gpm compared to the previously calculated 3,960 gpm at a total head of 241.0 feet reflects losses in the 20-inch pipe in Wait Street. An examination of the table shows that other points in the grid were not noticeably affected by the 0.5 foot change in total head. For example, the computed pressure variation at node 12 was 0.002 feet, i.e., essentially zero. Hence, it was concluded that the behavior of the grid at high elevations, in emergency conditions, depends almost entirely on the behavior of the two major mains in Wait Street and Fisher Avenue.

Total Hydrant Discharge at Zero psig - Table PH3: The maximum capabilities of the basic grid were determined by allowing the main pressure to fall to

zero psig at the point of withdrawal. At node 2 a discharge of approximately 7,000 gpm can be obtained with zero psig pressure in the main. This rather large main capacity indicates the need for careful study of hydrant and fire engine pumper capabilities at low main pressures.

Effect of Pipe Rehabilitation - Table PH4: This run compared with Table PH5, shows the effect of cleaning and lining the 20-inch pipe from Huntington Avenue to Parker Hill Avenue, and the 12-inch pipe in Fisher Avenue from Hayden Street to node 2 on Parker Hill Avenue. The total hydrant discharge was held at 3,760 gpm for both runs while the pressures throughout the grid and the distribution of inputs was allowed to vary. The results showed a minor increase in pressure of approximately 2 psi. Cleaning and cement-lining of the key mains is recommended because these mains interact with the overall Southern High Service operation.

Total Hydrant Discharge - 3,760 gpm - Table PH5: The total head at node 1 was set at 233.3 feet and pressures throughout the grid were computed for a distributed hyrant discharge of 3,760 gpm. This condition simulates the occurrence of a major fire in the hospitals near the summit coincident with an overall maximum demand on the system, Figure PH3. The total head of 233.3 feet reflects the assumption of increased capabilities of the MDC to maintain this pressure during periods of high demand throughout the City. This assumption should be valid after the Spring of 1967.

The run shows the remarkable strength of the Parker Hill grid and the excellent capabilities of the large pipes in Wait Street and Fisher Avenue. The total maximum hydraulic losses in the grid were less than 5 psi. Since a reasonable distribution of hydrant discharges was used in the analysis (750 gpm at nodes 2, 3, 36, 40, 41) the results show convincingly that the grid has adequate hydraulic capacity to deliver any reasonably large normal or emergency demand for water if hydrant and pumper capabilities can effectively use water at main pressures as low as approximately 5 psig.

The effect of cleaning and cement-lining to increase the hydraulic capacity of selected key mains is discussed above, (see Table PH6).

Fire Demand at Node 20 - Table PH6: Previous runs have concentrated on evaluation of grid capabilities with large hydrant discharges near the hospitals at the summit. This run studied capabilities to supply hydrant discharges at node 20, a node of reasonably high elevation located some distance from the 20-inch and 24-inch feeder mains. A maximum pressure drop of approximately 3 psi resulted in a minimum pressure of approximately 45 psi in the main at the location of the hydrant discharges. The results therefore indicate that the grid is adequate near node 20.

Maximum Normal Demand - Table PH7: The total head in Huntington Avenue was 233.3 feet with consumption on Parker Hill three times the estimated average daily demand. This condition approximates pressure conditions coincident with the maximum normal demand after the Spring of 1967 and should represent a typical mid-summer day near the hour of maximum water consumption, (Figure PH5). This distribution of demands was used as a base for super-position of hydrant discharges and for further studies of emergency operating conditions.

Maximum Normal Demand, Total Head = 240.5 - Table PH8: This run supplies supplementary information concerning normal grid behavior at a higher total head and with major consumptions at nodes 2, 3 and 4. The inputs to Parker Hill are approximately evenly divided between the takeoffs from Huntington Avenue and Heath Street. The maximum total hydraulic losses in the grid were less than 1 foot and the minimum pressure was approximately 13 psig at node 2.

Hydrant Discharges up to 4,450 gpm - Tables PH9, PH10, PH11: Hydrants near the summit were successively utilized to fight a hypothetical fire near the summit. The total head in Huntington Avenue, 240.5 feet, was available more than 60 percent of the time on a day of maximum demand prior to 1967, (Figure PH4). This total head will be available approximately 85 percent of the time on a similar day after the Spring of 1967. The computed pressure conditions are therefore realistic results of heavy demands for fire fighting and provide information about the grid performance if a major fire should break out near the summit of Parker Hill.

Initially, hydrants near nodes 2, 3 and 40 were discharging 750 gpm each. The minimum pressure was approximately 10 psig at node 40 with 55 percent of the total discharge coming from Huntington Avenue, (Table PH9). An additional discharge of 750 gpm near node 41 was then added to bring the total hydrant discharge to 3,760 gpm. The minimum pressure fell to 8 psig at node 41 with 54 percent of the total discharge still from the Huntington Avenue source, (Table PH10). Finally, an additional hydrant discharge was added near node 39 to bring the total to 4,450 gpm, (Table PH11). The resulting minimum pressure of approximately 6 psig occurred at node 41, the point of highest elevation. There was no change in the distribution of total discharge from Huntington Avenue and Heath Street.

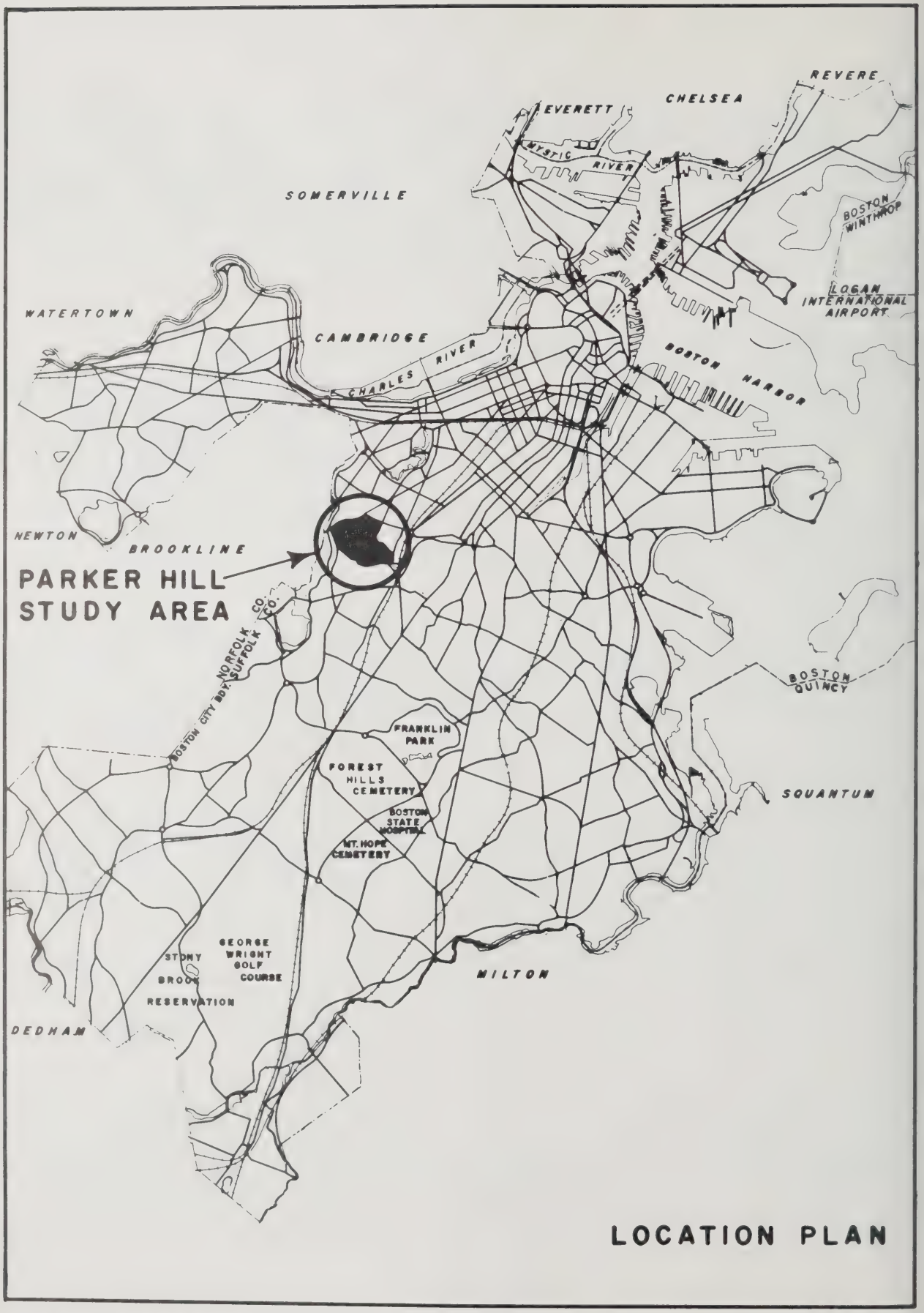
These results show how the grid is uniformly strengthened by the two large inputs from either side of the hill. Increases in hydrant discharges near the summit are provided by simultaneous increases in inputs from both sides of the hill so that a uniform distribution of flow is maintained throughout the grid. The importance of the large mains leading up the hill was effectively demonstrated in these runs.

Average Normal Demand - Table PH12: This run showed that the maximum hydraulic losses, under average conditions, are less than 1 foot. The normal pressure profile map of Parker Hill can therefore be visualized as an inverse topographic contour map with pressures essentially independent of discharge. The pressure contours can be obtained directly from Figure PH2 by subtracting the total head from the labeled contour. For example, the pressure at node 34, the intersection of Tremont Street and Pontiac Street, is approximately 180 feet or 78 psig (241 ft. - 60 ft.).

Effect of 6-inch Connection to 24-inch Main - Table PH13: Previous runs had assumed that the 24-inch and 12-inch mains in Fisher Avenue were directly connected. In reality, the connection consists of approximately 200 feet of 6-inch pipe between the two larger pipes. This run utilized an equivalent 8-inch pipe from node 12 to node 18 to accurately represent the field condition. A total hydrant discharge of 3,760 gpm was obtained from hydrants near the summit so that the results may be compared directly with those of Table PH10 to determine the influence of the connection on minimum pressures. Comparing pressures at node 40, the two runs show that the 6-inch connection has no appreciable effect on the grid performance at high hydrant discharge rates.

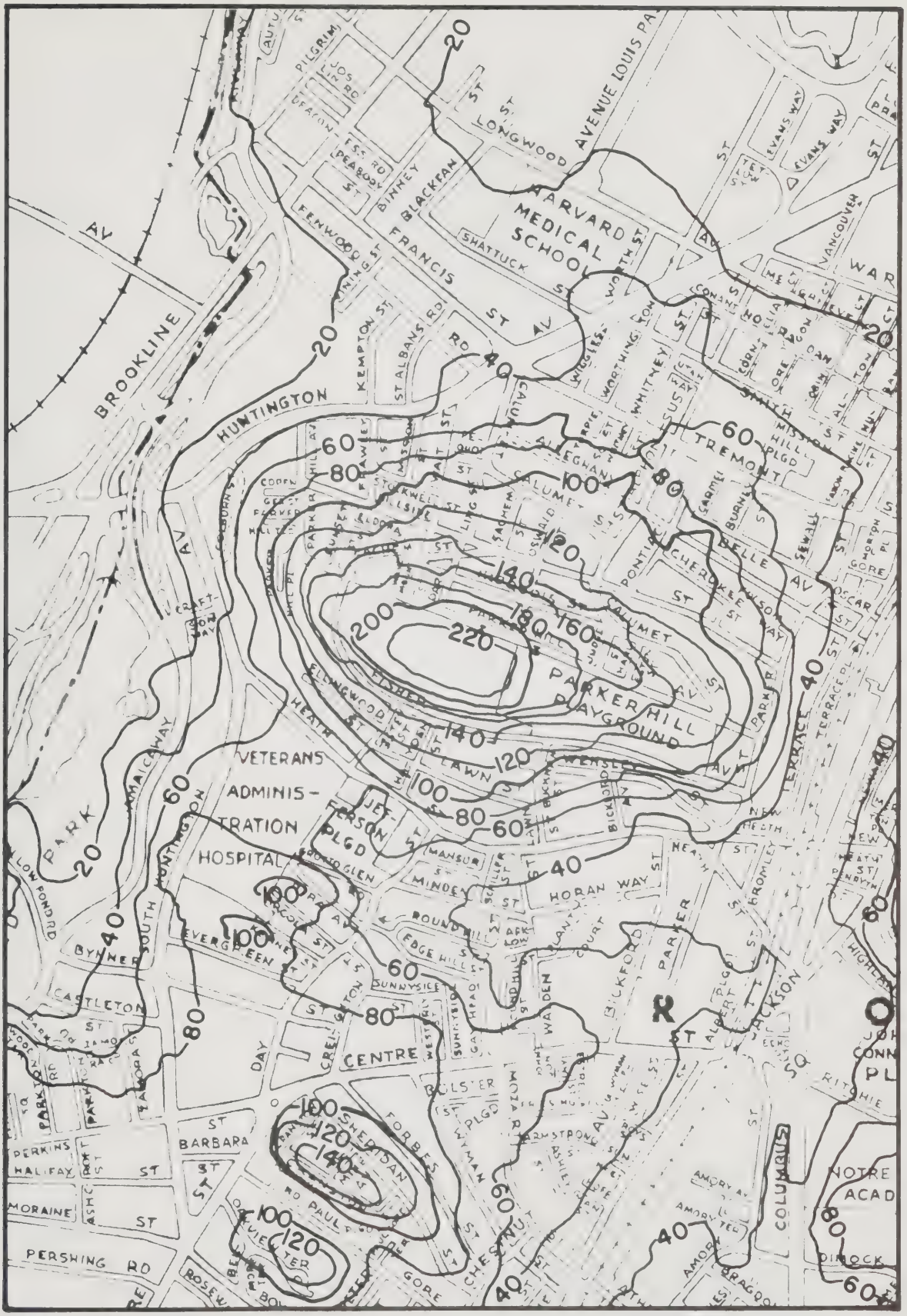
Huntington Avenue Out of Service - Table PH14: With a total hydrant discharge of 3,760 gpm near the summit the simulated condition with no supply from Huntington Avenue was examined. A major change in flow distribution resulted and pressures at nodes 40, 41 and 2 fell considerably below zero psig. The importance of being able to utilize both of the large mains which supply the summit was emphasized.

Heath Street Out of Service - Table PH15: This run showed that a total hydrant discharge of 3,760 gpm could be supplied to hydrants near the summit with the Heath Street supply shut off. The minimum pressure of approximately zero psig occurred at node 41.



BOSTON WATER

FIGURE–PH I

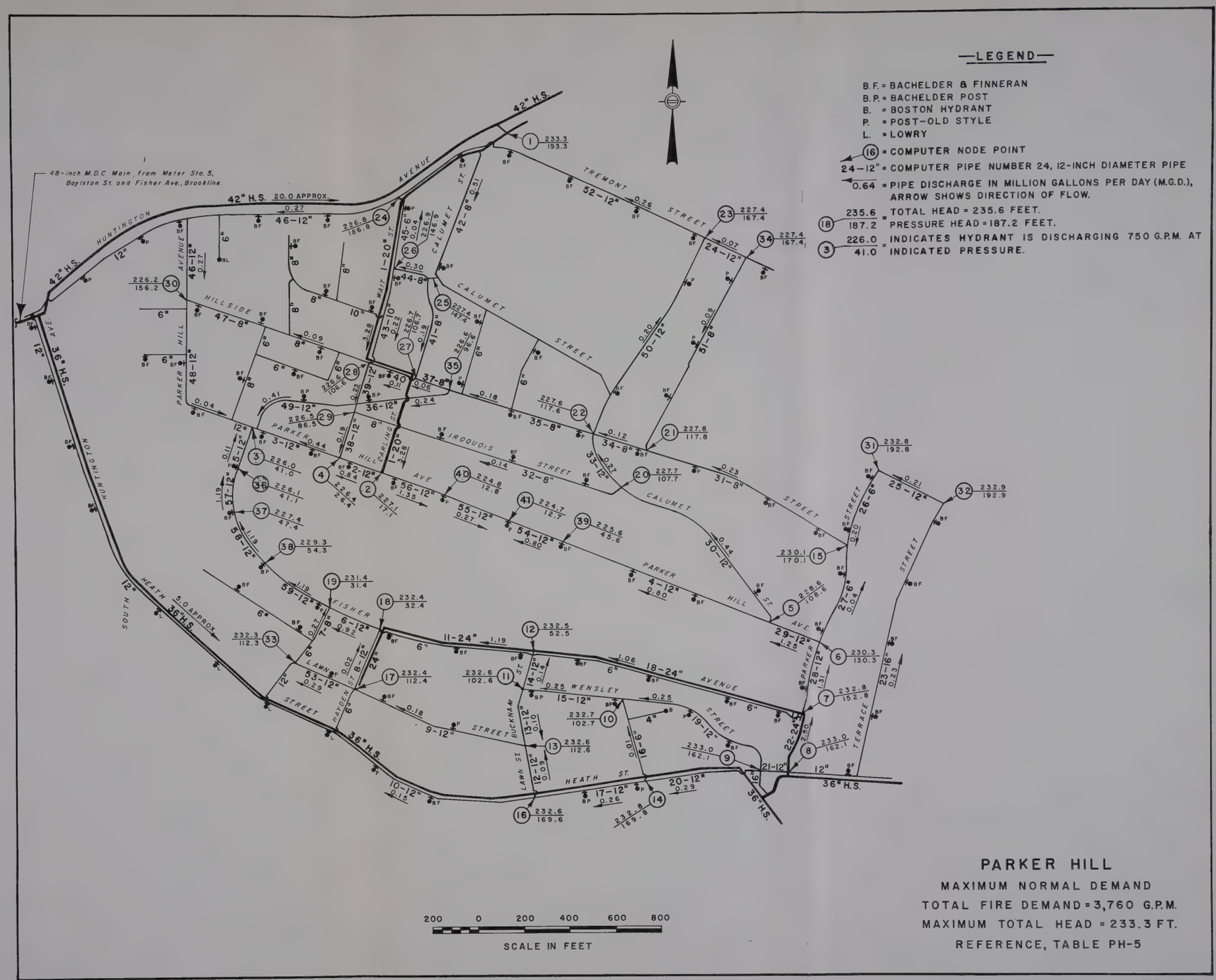


BOSTON WATER

PARKER HILL
CONTOUR PLAN
CONTOUR INTERVAL-20FT.
SCALE: 1" = 800'

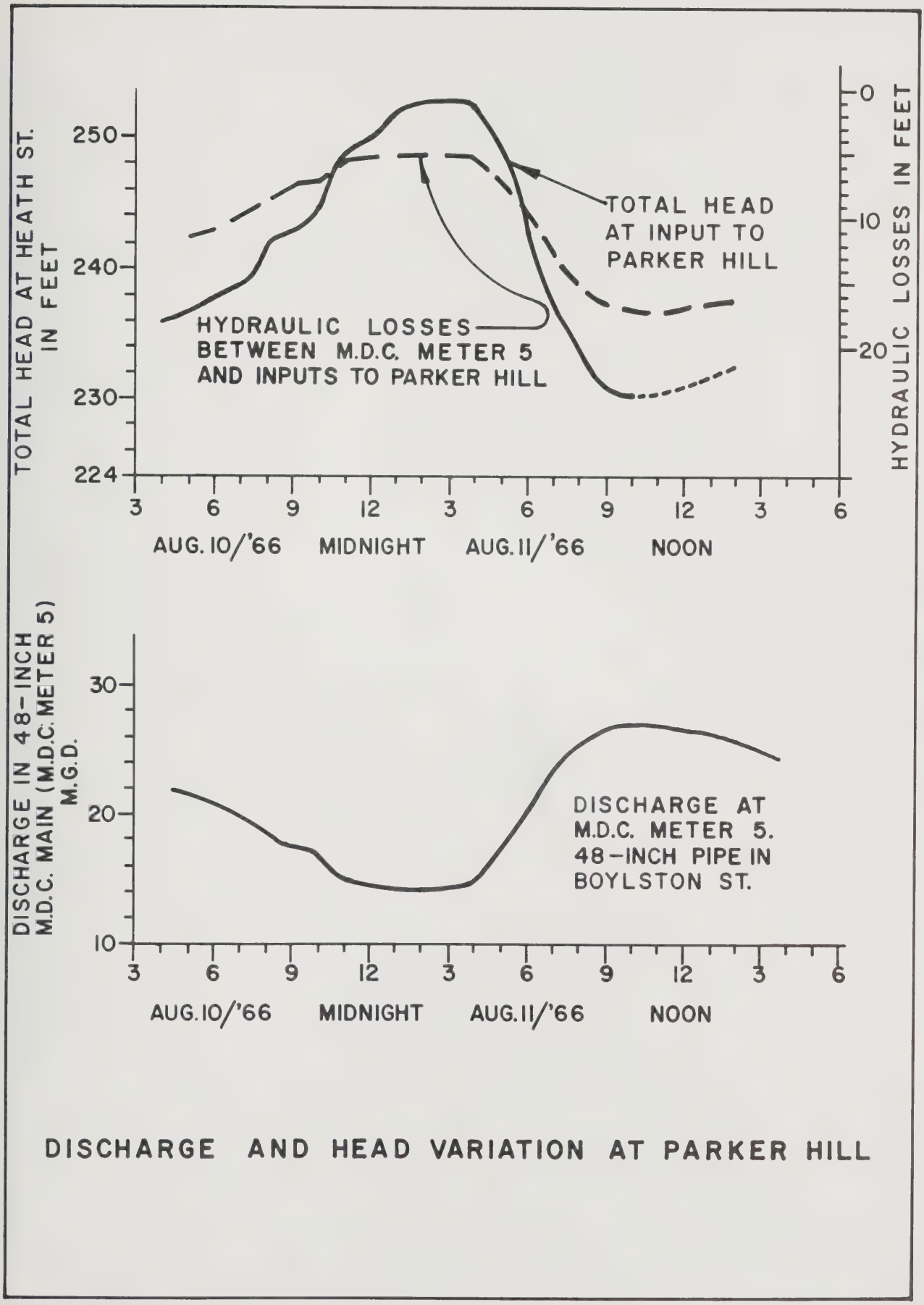
U.S.G.S. DATUM

FIGURE—PH 2



BOSTON WATER

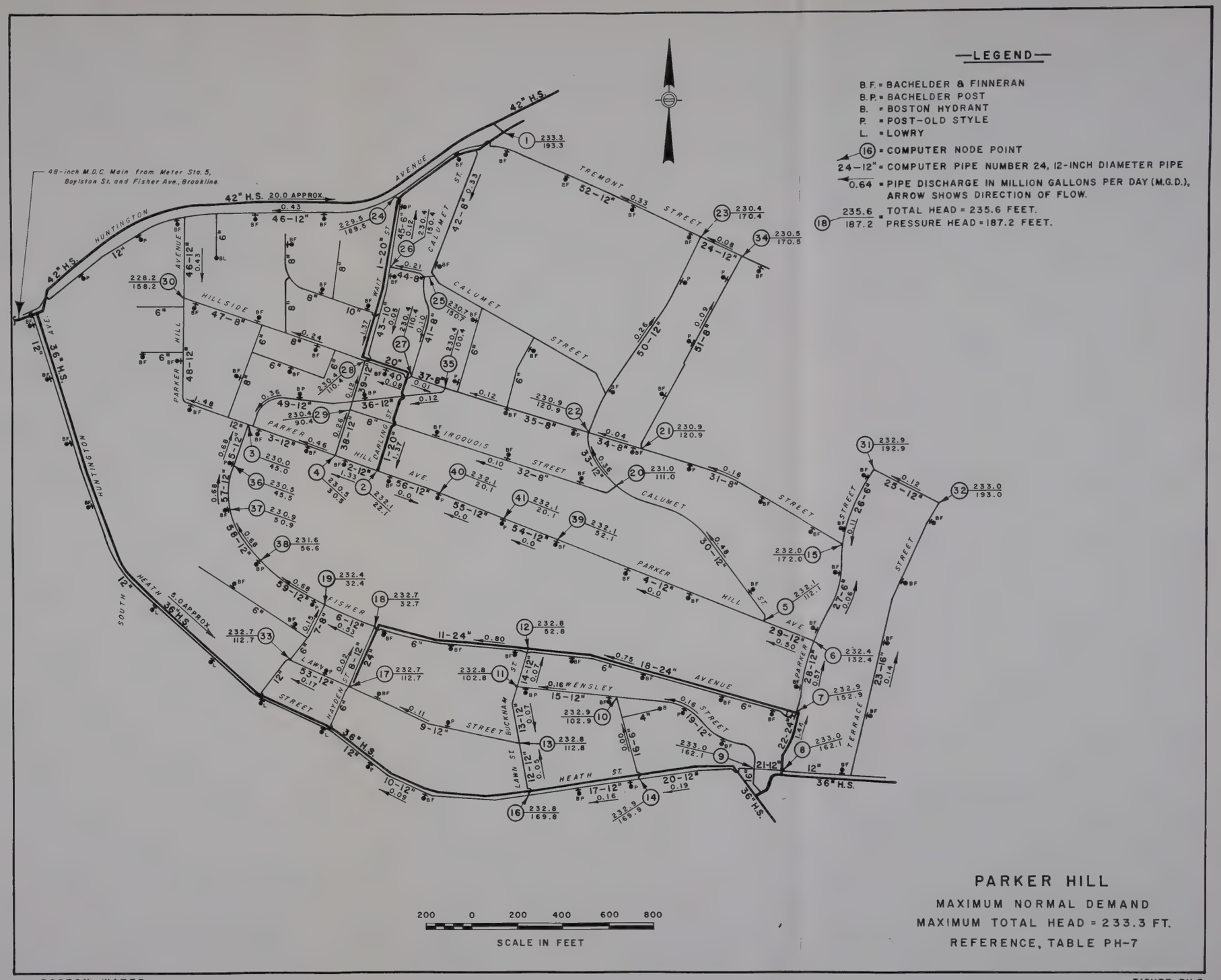
FIGURE-PH 3



DISCHARGE AND HEAD VARIATION AT PARKER HILL

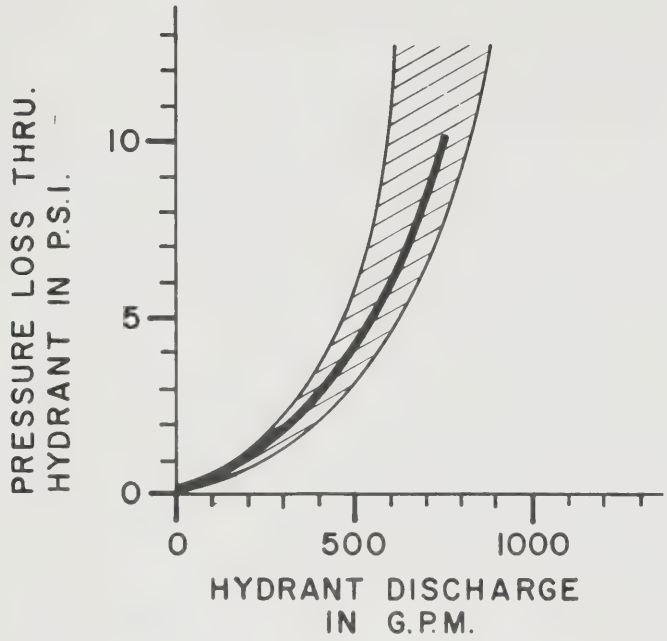
BOSTON WATER

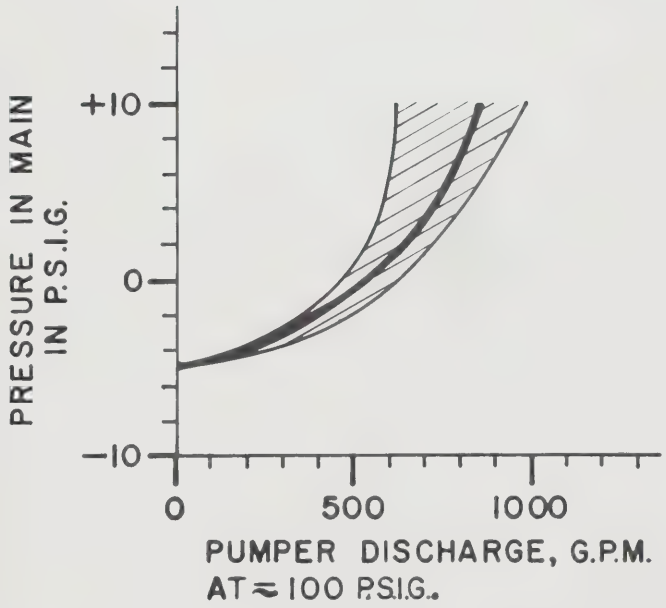
FIGURE-PH 4



BOSTON WATER

FIGURE-PH 5





HYDRANT AND PUMPER RATING CURVES

BOSTON WATER

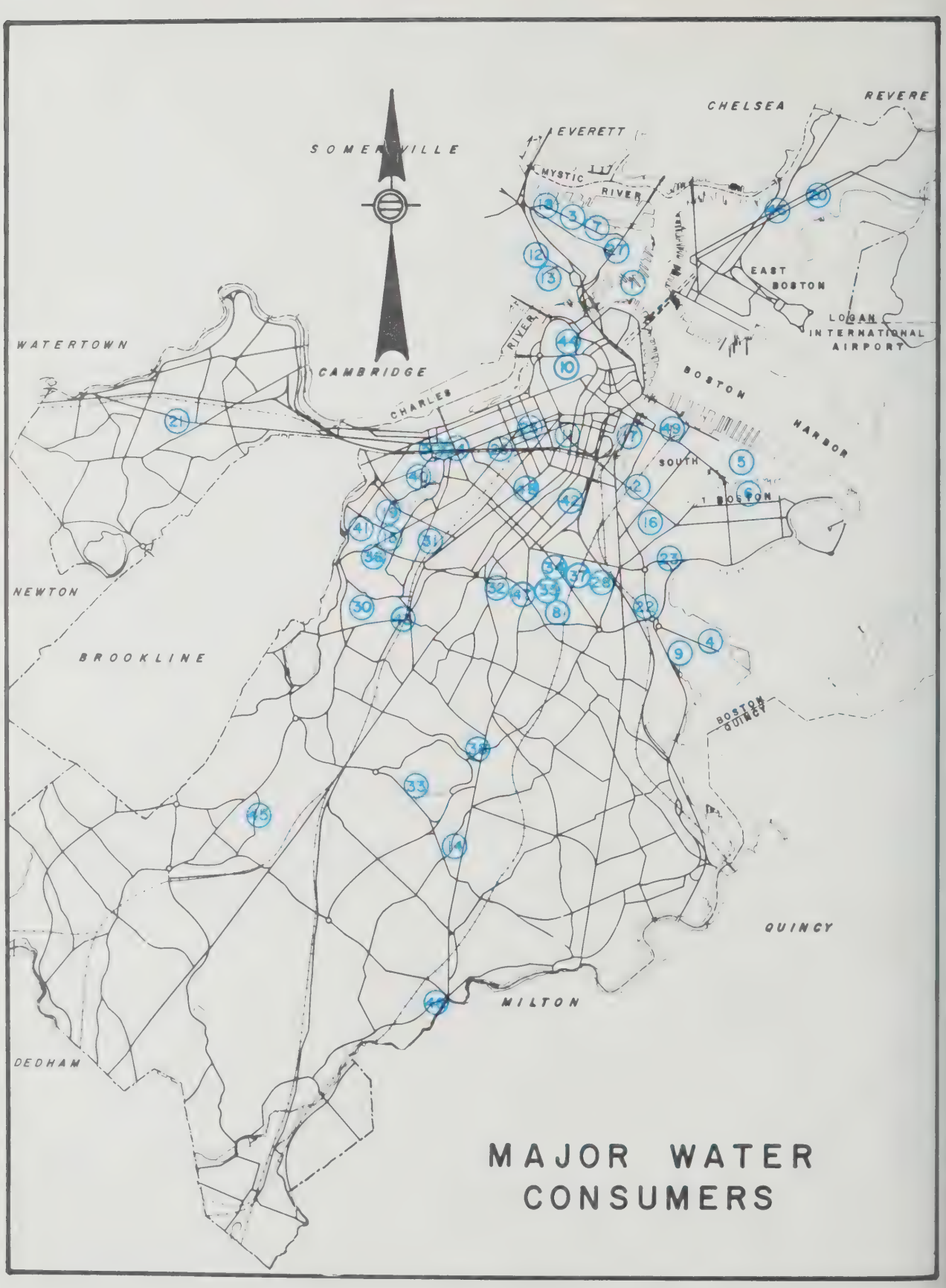
FIGURE—PH 6

Boston Water

APPENDIX WSU1

MAJOR WATER USERS

ABSTRACT: A compilation of the major water users in Boston is presented. A plan shows the locations of these users.



BOSTON WATER

FIGURE—AWSU I

RANK	NAME	APPROX. AVERAGE DAILY USE M.G.D.
1.	U. S. Government - Navy Yard 2 Water Street	1.740
2.	Gillette Safety Razor Gillette Park	1.04
3.	American Sugar Refinery 425 Medford Street	.765
4.	Boston Housing Authority 260 Mt. Vernon	.700
5.	U. S. Government - (Army-Navy) 299 Dry Dock Avenue	.690
6.	Boston Edison Company 810 Summer Street	.526
7.	Revere Sugar Refinery 327 Medford Street	.473
8.	D. Vose Trs. 1006 Massachusetts Avenue	.455
9.	Boston Globe 135 Morrissey Boulevard	.451
10.	Massachusetts General Hospital 52 Blossom Street	.420
11.	Statler Hilton 3 Columbus Avenue	.380
12.	Whitings Milk 554 Rutherford Avenue	.327
13.	H. P. Hood & Sons 494 Rutherford Avenue	.322
14.	Boston State Hospital 425 Harvard Street	.320
15.	Harvard University Hospital 25 Shattuck Street	.310
16.	Boston Housing Authority 222 D Street	.305
17.	New York, New Haven & Hartford Railroad South Station	.265

RANK	NAME	APPROX. AVERAGE DAILY USE M.G.D
18.	W. F. Sharaff 529 Main Street	.258
19.	Beth Israel Hospital 330 Brookline Avenue	.244
20.	McLellan Realty 144 Addison Street	.227
21.	Honeywell, Inc. 40 Life Street	.226
22.	Boston Housing Authority 345 Old Colony	.220
23.	Boston Housing Authority 265 East Ninth Street	.220
24.	Somerset Hotel 390 Commonwealth Avenue	.218
25.	John Hancock Building 200 Berkeley Street	.210
26.	Prudential Insurance 800 Boylston Street	.210
27.	Boston Housing Authority 55 Bunker Hill Street	.208
28.	Chamberlain Armour Meats & Company 301 Southampton Street	.200
29.	T. Hollingsworth Company 874 River Street	.186
30.	Veterans Administration Hospital 155 South Huntington	.177
31.	Boston Housing Authority 164 Ward Street	.171
32.	Boston Housing Authority 2 Ambrose Street	.167
33.	Shattuck Hospital 160 Norton Street	.149
34.	Columbia Packing 155 Southampton Street	.149

RANK	NAME	APPROX. AVERAGE DAILY USE M.G.D.
35.	New England Provisions 960 Massachusetts Avenue	.148
36.	Peter Bent Brigham 15 Francis Street	.146
37.	Market Realty 255 Southampton Street	.144
38.	M.D.C. Park Department 605 Blue Hill Avenue	.140
39.	Gorin & Leeder 89 Bickford Street	.139
40.	Hospital Laundry Association 18 Lansdowne	.126
41.	New England Deaconess Hospital 15 Deaconess Street	.123
42.	Boston Housing Authority 617 Harrison Avenue	.121
43.	Boston Housing Authority 10 Lambertine Street	.117
44.	Charles River Apartments Emerson Place	.109
45.	Hebrew Home for Aged 1200 Centre Street	.105
46.	Boston & Maine Railroad Chelsea Street	.103
47.	Morgan Laundry 939 Massachusetts Avenue	.101
48.	United Laundry 59 West Newton Street	.097
49.	Great A & P Tea Company 150 Northern Avenue	.095
50.	Hotel Kenmore 486 Commonwealth Avenue	.085
	Total	14.828 MGD

Boston Water

APPENDIX WSU2

SUMS

ABSTRACT: The computer program SUMS was used for integration, summation averaging and determination of the standard deviation of large data files. It was applied to the hourly discharge of all MDC meters on the peak days of each of the past ten years as well as to other large records.

SUMS

by David D. Moran and Charles D. D. Howard

I. INTRODUCTION

The computer program SUMS is a tool for integration, summation, averaging and determination of the standard deviation of a series of records. In general, the records may be any time function (temperature, pressure, etc.). The program was originally written for the analysis of pipe flow discharge records and this application will be discussed herein.

Figure 1 shows the time history of recorded hourly discharges past a gauging station in a pipe. The subscript j refers to the gauging station number. The subscript i refers to the day on which the gauging was made. For each hour of this day, a value of k is assigned between 1 and 24. It is seen that the flow, designated by F is a three-dimensional variable and may be written as $F_{i,j,k}$.

The program SUMS was designed to answer such questions as:

1. For a given meter, what is the average flow at any hour over a number of days.
2. For a given day, what is the average flow at each meter, in all meters, and at each hour of the day.

These relatively simple calculations represent a prodigious task, if a large number of meters and a large number of days are involved.

The operations performed by SUMS are:

1. For each meter j and each day i, the discharge record is integrated over all time (over k from k=1 to k=NH). The trapezoidal approximation is used for this integration. The result, the total discharge for each day, is designated as $F_{i,j,NHP}$, (NHP = NH + 1).

2. For each hour k of every day i, the discharges are summed over all meters j,(j = 1 to NM). The resulting total system flow is designated as $F_{i,NMP,k}$, (NMP = NM + 1). The total daily system flow is also found by summing the daily totals, $F_{i,j,NHP}$ from step 1 above, over all meters. These total daily system flows are designated as $F_{i,NMP,\ NHP}$.

3. For each hour k for every meter j the discharges are averaged over all days i, (i = 1 to ND). The resulting average daily flows are designated $F_{NDP,\ j,k}$, (NDP = ND + 1). At this point the standard deviation from this mean is found for each case and is designated $F_{NDPP,\ j,\ k}$, (NDPP = ND + 2). The program also determines the following:

a. The average total discharge $F_{NDP,\ j,\ NHP}$ for each meter j, (j = 1 to NM) and the standard deviation from this mean, $F_{NDPP,\ j,\ NHP}$.

b. The average hourly system flow for each hour k, (k = 1 to NH), $F_{NDP,\ NMP,\ k}$ and the standard deviation from this mean, $F_{NDPP,\ NMP,k}$.

c. The average total daily system flow $F_{NDP,NMP,NHP}$ and its standard deviation $F_{NDPP,\ NMP,\ NHP}$.

At this point the reader is probably thoroughly confused by the array of subscripts. Figure 2 may be referred to, and hopefully, will clarify the notation. The use of the three-dimensional variable $F_{i,j,k}$ greatly simplified the programming.

II. USE OF THE PROGRAM

This program was designed for use with the same data cards prepared for the correlation studies outlined in Appendix WSU3. The 24 hourly records are punched on two data cards with 12 numbers on each card in a 12F6.1 Format. The identification codes for the day and meter number are punched on the first card as follows:

1. Meter number must be punched in Columns 74-76.

2. Column 73 is reserved for an alphameric meter identification tag and may be any letter of the alphabet.

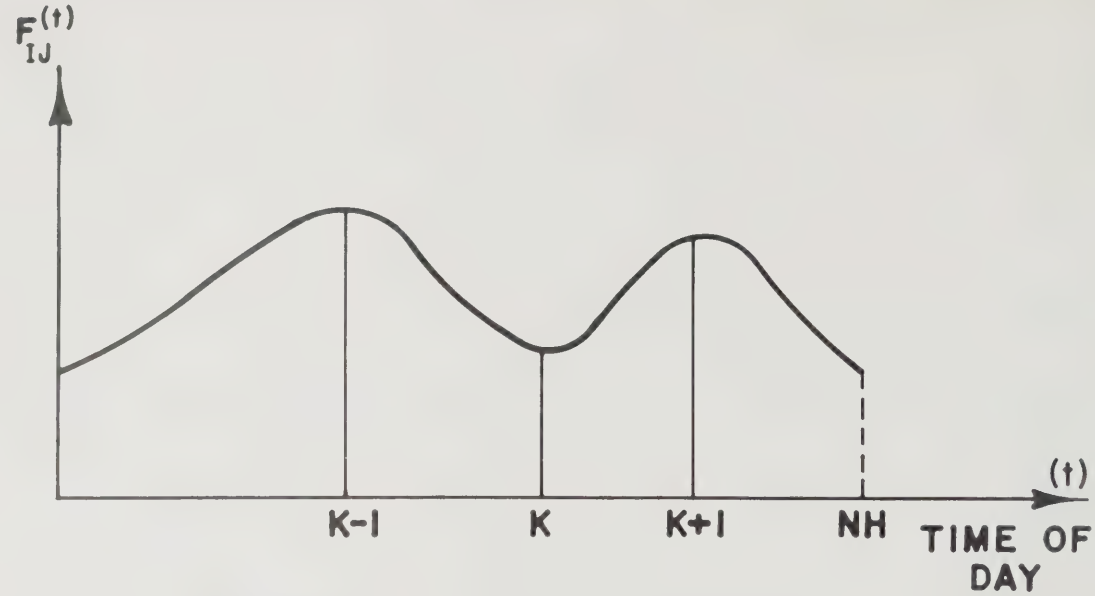
3. Day number is punched in Columns 78-80 (day 173 of 1966 was June 23rd).

4. A or B is punched in Column 77 depending upon whether the card is the first or second in the set of two respectively.

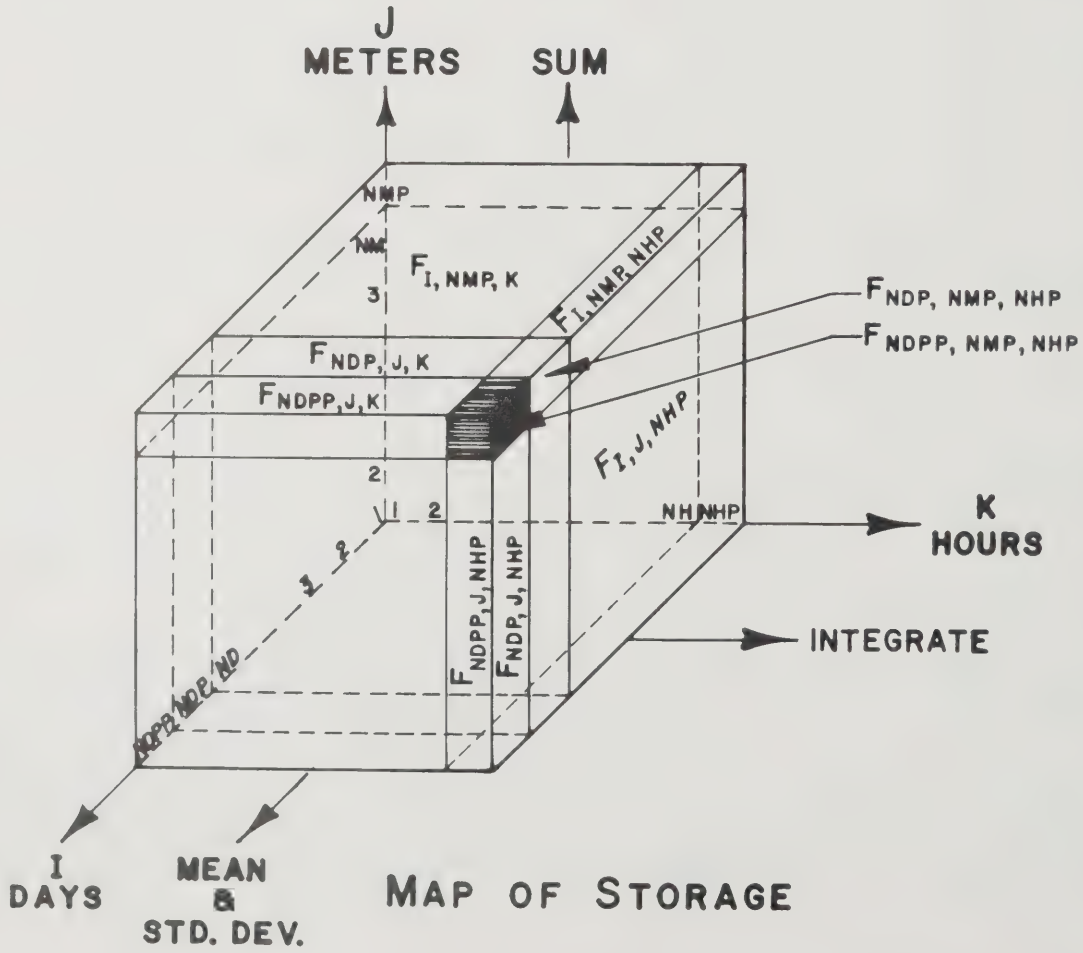
The following information will be useful when preparing a data deck for a run.

1. The first data card must contain the number of days, ND, which are being studied, the number of meters in the system, NM, and the number of data points obtained on each day, NH (NH is normally 24).

2. The pairs of data cards for the system must be stacked in the following order (and only in this order) after the initial identification card. For each meter, the daily data cards may be stacked in any desired order, but this order must be the same for all meters (usually in chronological order). These groups of data for each meter may then be stacked in any desired order (usually in numerical order by meters). The data deck is now ready for a run. Additional runs may be made by stacking successive complete data decks behind the first.



RECORDED PIPE DISCHARGE
FIGURE – 1



MAP OF STORAGE

BOSTON WATER

FIGURE – AWSU 2

A system of two meters which was gauged for three days, 24 hours each day, would have ND = 3, NM = 2, NH = 24. The completed data deck would be stacked as follows:

Card Number			
1	---3---2--24		
2	Meter No. 1	Day 100	Card A (AM)
3	"	"	Card B (PM)
4	"	Day 101	Card A (AM)
5	"	"	Card B (PM)
6	"	Day 200	Card A (AM)
7	"	"	Card B (PM)
8	Meter No. 9	Day 100	Card A (AM)
9	"	"	Card B (PM)
10	"	Day 101	Card A (AM)
11	"	"	Card B (PM)
12	"	Day 200	Card A (AM)
13	"	"	Card B (PM)

III. OUTPUT

The output from SUMS should be self-explanatory with the following definitions:

a. System flow is defined as the sum of discharges over all meters.

b. Daily flow is the total flow for a day for a particular meter. (Daily flow corresponds to the area under the curve of Figure 1)

c. The average flow histogram is the time distribution of the average hourly discharges. These averages were obtained over all meters for all hours.

IV. PROGRAM RESTRICTIONS

A. $1 \leq ND \leq 14$

B. $1 \leq NM \leq 25$

C. $13 \leq NH \leq 24$

The special cases of ND = 1, NM = 1, and NH = 13 may not work on some computers.

D. The output format assumes that the data is in units of million gallons per day. However, this assumption has no effect upon actual program operation.

```
F
C     SUMS PROGRAM
C
C     ND=NO. OF DAYS / NM=NO. OF METERS / NH=NO. OF HOURS
C     NO(1,I)=DAY NUMBER / NO(2,4)=METER NUMBER / NO(3,J)=METER CODE
C     INPUT CNLY IN THE FOLLOWING ORDER * FOR EACH METER INPUT ALL DAYS
C     IN NUMERICAL ORDER * DO THIS FOR ALL METERS USING THE SAME ORDER *
C     INPUT SMALLEST NUMBERS FIRST FOR BOTH TYPES
C
      DIMENSION F(16,26,25),NO(3,25)
C
 1001 FORMAT(3I4)
 1002 FORMAT(12F6.2,A1,I3,1X,I3)
 2001 FORMAT(26H INPUT ERROR * EXIT CALLED)
 2002 FORMAT(25H TOTAL FLOW VALUES * NEXT,I3,6H PAGES)
 2003 FORMAT(1H1,3HDAY,I4,21H * TOTAL FLOW THROUGH,I3,9H METERS =,F6.2,
     14H MGD)
 2004 FORMAT(1H0,5X,22HHOUR      SYSTEM FLOW (,I3,14H GAUGES) (MGD))
 2005 FORMAT(7X,I2,5X,F10.5)
 2006 FORMAT(1H0,5X,20HMETER   DAILY FLOW (,I3,13H HOURS) (MGD))
 2007 FORMAT(6X,A1,I4,4X,F10.5)
 2008 FORMAT(1H1,21HAVERAGE VALUES * NEXT,I3,6H PAGES)
 2009 FORMAT(1H1,6HMETER ,A1,I4,5X,22HAVERAGE DAILY FLOW FOR,I3,7H DAYS
     1=,F10.5,17H MGD  * STD DEV =,F10.5)
 2010 FORMAT(1H0,5X,60HHOUR      AVE FLOW      STD DEV      (FLOW IN MGD AV
     1ERAGED OVER,I3,6H DAYS))
 2011 FORMAT(7X,I2,4X,F10.5,3X,F9.5)
 2012 FORMAT(1H1,15X,34H***** AVERAGE FLOW HISTOGRAM *****)
 2013 FORMAT(1H0,6X,25H** AVERAGE OVER SYSTEM OF,I3,11H METERS AND,I3,8H
     1 DAYS **)
 2014 FORMAT(1H0,14X,47HHOUR      SYSTEM FLOW      STD DEV     FLOW IN MGD)
 2015 FORMAT(15X,I2,7X,F10.5,4X,F10.5)
 2016 FORMAT(1H0,25X,11H***********)
 2017 FORMAT(1H0,36HAVERAGE DAILY FLOW THROUGH SYSTEM OF,I3,22H METERS,
     1AVERAGED OVER,I3,8H DAYS IS)
 2018 FORMAT(10X,6HFLOW =,F10.5,24H MILLION GALLONS PER DAY)
 2019 FORMAT(10X,9HSTD DEV =,F10.5,6H (OVER,I3,6H DAYS))
 2020 FORMAT(1H0,24X,13HEND OF OUTPUT)
C
C     INPUT ROUTINE
C
   10 READ 1001,ND,NM,NH
      DO 20 I=1,ND
   20 NO(1,I)=0
      DO 30 J=1,NM
   30 NO(2,I)=0
      XNH=NH
      XND=ND
      NDP=ND+1
      NMP=NM+1
      NHP=NH+1
      NDPP=NDP+1
C
       DO 50 I=1,NDPP
      DO 50 J=1,NMP
      DO 50 K=1,NHP
```

```
   50 F(I,J,K)=0.0
C
      DO 200 J=1,NM
      DO 200 I=1,ND
      READ 1002,(F(I,J,K),K=1,12),NO(3,J),NO(2,J),NO(1,I)
      READ 1002,(F(I,J,K),K=13,NH)
  200 CONTINUE
C
C     COMPUTE ROUTINE
C
      NHM=NH-1
      DO 230 I=1,ND
      DO 230 J=1,NM
      DO 220 K=1,NHM
      KP=K+1
  220 F(I,J,NHP)=F(I,J,NHP)+F(I,J,K)+F(I,J,KP)
  230 F(I,J,NHP)=F(I,J,NHP)/(2.0*XNH)
C
C
      DO 250 I=1,ND
      DO 250 K=1,NHP
      DO 250 J=1,NM
  250 F(I,NMP,K)=F(I,NMP,K)+F(I,J,K)
C
C
      DO 350 J=1,NMP
      DO 350 K=1,NHP
      DO 300 I=1,ND
  300 F(NDP,J,K)=F(NDP,J,K)+F(I,J,K)
      F(NDP,J,K)=F(NDP,J,K)/XND
      DO 320 I=1,ND
  320 F(NDPP,J,K)=F(NDPP,J,K)+(F(I,J,K)-F(NDP,J,K))**2
321   F(NDPP,J,K)=(F(NDPP,J,K)/(XND-1.))**.5
  350 CONTINUE
C
C     OUTPUT ROUTINE
C
      PRINT 2002,ND
      DO 430 I=1,ND
      PRINT 2003,NO(1,I),NM,F(I,NMP,NHP)
      PRINT 2004,NM
      DO 410 K=1,NH
  410 PRINT 2005,K,F(I,NMP,K)
      PRINT 2006,NH
      DO 420 J=1,NM
  420 PRINT 2007,NO(3,J),NO(2,J),F(I,J,NHP)
  430 CONTINUE
      PRINT 2008,NMP
      DO 450 J=1,NM
      PRINT 2009,NO(3,J),NO(2,J),ND,F(NDP,J,NHP),F(NDPP,J,NHP)
      PRINT 2010,ND
      DO 440 K=1,NH
  440 PRINT 2011,K,F(NDP,J,K),F(NDPP,J,K)
  450 CONTINUE
      PRINT 2012
      PRINT 2013,NM,ND
      PRINT 2014
      DO 460 K=1,NH
  460 PRINT 2015,K,F(NDP,NMP,K),F(NDPP,NMP,K)
      PRINT 2016
      PRINT 2017,NM,ND
      PRINT 2018,F(NDP,NMP,NHP)
      PRINT 2019,F(NDPP,NMP,NHP),ND
      PRINT 2016
      PRINT 2020
      PRINT 2016
      GO TO 10
      END(1,1,0,0,0,0,1,1,0,0,0,0,0,0,0)
```

DAY 199 * TOTAL FLOW THROUGH 2 METERS = 3.72 MGD

HOUR	SYSTEM FLOW (2 GAUGES) (MGD)
1	2.00000
2	1.50000
3	1.30000
4	1.20000
5	1.40000
6	2.50000
7	2.90000
8	3.60000
9	4.00000
10	4.30000
11	4.50000
12	4.50000
13	4.40000
14	4.40000
15	4.60000
16	5.00000
17	5.70000
18	5.80000
19	6.20000
20	5.70000
21	5.30000
22	5.00000
23	3.40000
24	2.20000

METER	DAILY FLOW (24 HOURS) (MGD)
G 73	1.82083
G 170	1.90000

DAY 222 * TOTAL FLOW THROUGH 2 METERS = 3.45 MGD

HOUR	SYSTEM FLOW (2 GAUGES) (MGD)
1	2.60000
2	2.20000
3	2.05000
4	2.00000
5	2.10000
6	2.30000
7	2.80000
8	3.00000
9	3.40000
10	3.60000
11	4.40000
12	4.10000
13	4.20000
14	4.20000
15	4.10000
16	4.20000
17	4.50000
18	5.20000
19	5.40000
20	5.20000
21	4.10000
22	3.40000
23	3.60000
24	2.90000

METER	DAILY FLOW (24 HOURS) (MGD)
G 73	1.15000
G 170	2.30000

DAY 201 * TOTAL FLOW THROUGH 2 METERS = 3.95 MGD

HOUR	SYSTEM FLOW (2 GAUGES) (MGD)
1	2.03000
2	1.75000
3	1.72000
4	1.72000
5	1.88000
6	2.20000
7	3.00000
8	4.31000
9	4.45000
10	4.70000
11	4.75000
12	4.55000
13	4.65000
14	4.75000
15	4.65000
16	4.75000
17	5.20000
18	5.75000
19	6.30000
20	6.35000
21	5.45000
22	5.70000
23	3.80000
24	2.60000

METER	DAILY FLOW (24 HOURS) (MGD)
G 73	1.28104
G 170	2.66458

DAY 207 * TOTAL FLOW THROUGH 2 METERS = 4.06 MGD

HOUR	SYSTEM FLOW (2 GAUGES) (MGD)
1	1.85000
2	1.60000
3	1.58000
4	1.50000
5	1.60000
6	2.10000
7	3.15000
8	4.50000
9	4.60000
10	5.60000
11	5.50000
12	5.40000
13	5.40000
14	5.50000
15	5.60000
16	5.60000
17	5.85000
18	6.13000
19	6.65000
20	6.18000
21	4.90000
22	3.70000
23	2.80000
24	2.35000

METER	DAILY FLOW (24 HOURS) (MGD)
G 73	1.29125
G 170	2.77292

DAY 220 * TOTAL FLOW THROUGH 2 METERS = 3.04 MGD

HOUR	SYSTEM FLOW (2 GAUGES) (MGD)
1	1.57000
2	1.45000
3	1.50000
4	1.55000
5	1.70000
6	1.80000
7	3.65000
8	4.00000
9	4.10000
10	4.20000
11	3.80000
12	3.50000
13	3.55000
14	3.60000
15	3.50000
16	3.45000
17	4.00000
18	4.40000
19	4.65000
20	3.80000
21	3.95000
22	3.00000
23	2.30000
24	1.65000

METER	DAILY FLOW (24 HOURS) (MGD)
G 73	1.03792
G 170	2.00625

DAY 222 * TOTAL FLOW THROUGH 2 METERS = 3.33 MGD

HOUR	SYSTEM FLOW (2 GAUGES) (MGD)
1	1.30000
2	1.40000
3	1.10000
4	1.15000
5	1.40000
6	2.13000
7	3.50000
8	4.30000
9	4.50000
10	4.30000
11	3.60000
12	3.60000
13	4.30000
14	4.30000
15	4.35000
16	4.45000
17	4.80000
18	5.30000
19	5.90000
20	4.60000
21	4.10000
22	3.00000
23	2.40000
24	1.65000

METER	DAILY FLOW (24 HOURS) (MGD)
G 73	1.03146
G 170	2.30000

DAY 234 * TOTAL FLOW THROUGH 2 METERS = 3.34 MGD

HOUR	SYSTEM FLOW (2 GAUGES) (MGD)
1	1.90000
2	1.75000
3	1.73000
4	1.73000
5	1.80000
6	1.99000
7	2.80000
8	3.43000
9	3.90000
10	4.10000
11	4.22000
12	4.00000
13	3.95000
14	3.95000
15	3.95000
16	4.00000
17	4.30000
18	4.80000
19	5.35000
20	5.20000
21	4.00000
22	4.50000
23	2.60000
24	2.20000

METER	DAILY FLOW (24 HOURS) (MGD)
G 73	1.10625
G 170	2.23125

DAY 232 * TOTAL FLOW THROUGH 2 METERS = 3.35 MGD

HOUR	SYSTEM FLOW (2 GAUGES) (MGD)
1	2.30000
2	2.00000
3	1.60000
4	1.40000
5	1.40000
6	1.40000
7	1.70000
8	3.10000
9	4.20000
10	4.00000
11	4.50000
12	4.00000
13	3.90000
14	4.00000
15	3.90000
16	4.00000
17	4.20000
18	4.50000
19	5.10000
20	6.00000
21	5.60000
22	4.30000
23	3.10000
24	2.60000

METER	DAILY FLOW (24 HOURS) (MGD)
G 73	1.06042
G 170	2.28750

METER G 73 AVERAGE DAILY FLOW FOR 8 DAYS = 1.22240 MGD * STD DEV = 0.26234

(FLOW IN MGD AVERAGED OVER 8 DAYS)

HOUR	AVE FLOW	STD DEV
1	0.80625	0.28385
2	0.68125	0.17513
3	0.61000	0.13277
4	0.59375	0.11083
5	0.63500	0.10461
6	0.71500	0.13049
7	0.97500	0.22678
8	1.20500	0.22322
9	1.36875	0.18310
10	1.51250	0.23566
11	1.53375	0.34430
12	1.48125	0.36247
13	1.45625	0.34063
14	1.45000	0.34330
15	1.45625	0.33428
16	1.48125	0.33905
17	1.55625	0.33106
18	1.67250	0.28769
19	1.86875	0.38167
20	1.91625	0.60460
21	1.75000	0.74498
22	1.46250	0.84166
23	1.11250	0.57678
24	0.88125	0.27895

METER G 170 AVERAGE DAILY FLOW FOR 8 DAYS = 2.30781 MGD * STD DEV = 0.29453

(FLOW IN MGD AVERAGED OVER 8 DAYS)

HOUR	AVE FLOW	STD DEV
1	1.13750	0.31139
2	1.02500	0.23755
3	0.96250	0.21339
4	0.93750	0.20659
5	1.02500	0.16690
6	1.33750	0.32923
7	1.96250	0.47189
8	2.57500	0.44641
9	2.77500	0.35757
10	2.83750	0.51807
11	2.87500	0.51478
12	2.72500	0.50639
13	2.83750	0.49839
14	2.88750	0.52491
15	2.87500	0.53918
16	2.95000	0.48107
17	3.26250	0.46885
18	3.56250	0.44381
19	3.82500	0.51478
20	3.46250	0.69885
21	2.92500	0.57756
22	2.61250	0.78456
23	1.88750	0.58661
24	1.38750	0.44541

***** AVERAGE FLOW HISTOGRAM *****

** AVERAGE OVER SYSTEM OF 2 METERS AND 8 DAYS **

HOUR	SYSTEM FLOW	STD DEV	FLOW IN MGD
1	1.94375	0.40231	
2	1.70625	0.27959	
3	1.57250	0.28739	
4	1.53125	0.28498	
5	1.66000	0.25901	
6	2.05250	0.33487	
7	2.93750	0.59085	
8	3.78000	0.57864	
9	4.14375	0.39046	
10	4.35000	0.59281	
11	4.40875	0.58362	
12	4.20625	0.60853	
13	4.29375	0.56025	
14	4.33750	0.57987	
15	4.33125	0.63916	
16	4.43125	0.67397	
17	4.81875	0.69792	
18	5.23500	0.63444	
19	5.69375	0.67899	
20	5.37875	0.86498	
21	4.67500	0.71114	
22	4.07500	0.97358	
23	3.00000	0.56315	
24	2.26875	0.44716	

****

AVERAGE DAILY FLOW THROUGH SYSTEM OF 2 METERS, AVERAGED OVER 8 DAYS I
FLOW = 3.53021 MILLION GALLONS PER DAY
STD DEV = 0.34776 (OVER 8 DAYS)

****

END OF OUTPUT

****

Boston Water

APPENDIX WSU3

APPLICATIONS OF CORRELATION STUDIES

ABSTRACT: Two Fortran computer programs for computing correlation coefficients from discrete hourly records are described. The programs were used to relate Pitometer gauging records to MDC venturi data.

APPLICATIONS OF CORRELATION STUDIES TO WATER DISTRIBUTION SYSTEMS ANALYSIS

by David D. Moran and Charles D.D. Howard

I. GENERAL INFORMATION

The purpose of this report is to describe how a correlation study can reveal important information about the operation of a water distribution system. Specifically, the application to the study of the Boston water system will be discussed.

For the purpose of this discussion, the correlation coefficient r between two sets of data X_i (i= 1, 2, 3, ... n) and Y_i (i = 1, 2, 3, ... n) which are assumed to be linearly related, will be defined as follows:

$$r = \frac{n\left(\sum_{i=1}^{n} X_i Y_i\right) - \left(\sum_{i=1}^{n} X_i\right)\left(\sum_{i=1}^{n} Y_i\right)}{\sqrt{\left\{n\sum_{i=1}^{n} X^2_i - \left(\sum_{i=1}^{n} X_i\right)^2\right\}\left\{n\sum_{i=1}^{n} Y^2_i - \left(\sum_{i=1}^{n} Y_i\right)^2\right\}}}$$

in which n is the number of elements in the sets X_i and Y_i.[1]

The correlation coefficient r may take on any value between plus and minus one. The coefficient of +1 would indicate that the two records are exactly in phase with each other and differ in magnitude by only a scale factor. Conversely, a coefficient of -1 indicates that one record looks like a scaled mirror image of the other. If the records are purely random, the correlation coefficient would be zero.

The coefficient of 1.0 indicates that one record could be obtained directly from the other by a suitable linear scaling process whereas a coefficient of zero shows that it is hopeless to attempt prediction of one record from the other. In the study of physical systems, correlation coefficients are often used to indicate a degree of dependence between parameters in the system. It is therefore necessary to have some indication of the importance of a computed correlation coefficient. Intuitively, one would expect that for very short records, even a high correlation coefficient would not necessarily indicate a strong linear relationship between the two variables. It is evident that the significance of a correlation coefficient depends upon the length of the record which was used to calculate it. The following guidelines may be used in evaluating the significance of a computed correlation coefficient.

Considering only r >0, let r_c be a critical correlation coefficient such that for any r greater than r_c we may be B% confident that the two records are linearly related to each other. We expect that for any B, r_c depends upon the number of pieces of data, n, that were used to determine r. Table 1 was

---

[1]Kurtz, Thomas E.; Basic Statistics, Prentice-Hall, Inc.; Englewood Cliffs, New Jersey, 1963.

TABLE I

CRITICAL CORRELATION COEFFICIENT

no. of hours	B = 80%	B = 90%	B = 95%	B = 99%	B = 99.9%
3	0.951	0.988	0.997	0.999	≡1.0
4	0.806	0.900	0.956	0.994	0.998
5	0.688	0.805	0.878	0.959	0.995
6	0.608	0.730	0.811	0.919	0.960
7	0.552	0.669	0.755	0.875	0.950
8	0.507	0.621	0.707	0.834	0.925
9	0.473	0.583	0.664	0.798	0.885
10	0.444	0.549	0.631	0.765	0.870
11	0.418	0.521	0.602	0.735	0.849
12	0.398	0.497	0.576	0.707	0.825
13	0.379	0.477	0.553	0.683	0.791
14	0.365	0.457	0.532	0.661	0.775
15	0.351	0.441	0.514	0.641	0.760
16	0.338	0.426	0.498	0.623	0.745
17	0.327	0.412	0.482	0.606	0.725
18	0.318	0.400	0.468	0.591	0.715
19	0.307	0.389	0.456	0.575	0.698
20	0.299	0.378	0.444	0.561	0.690
21	0.292	0.369	0.433	0.549	0.659
22	0.283	0.360	0.423	0.537	0.654
23	0.277	0.351	0.413	0.525	0.639
24	0.271	0.344	0.404	0.516	0.630

computed by standard methods based on the student's "t" test for significance (Kurtz). Suppose for example, that 19 hours of water consumption records were used to compute the correlation coefficient for two continuously registering water meters. Table 1 shows that if the computed correlation coefficient is greater than .575, we may be 99% confident that the two records are linearly related. A coefficient of .698 or greater would give us 99.9% confidence.

This interpretation of the confidence level B is not strictly rigorous, but is suitable for engineering purposes. Experience with the particular records being studied and the specific applications to be made provide important complementary information for the engineer's judgment concerning the significance of computed coefficients. In practice it was found that hourly gauging records made over a 24-hour period within the Boston distribution system had coefficients greater than 0.95 when correlated against continuously recording system input meters. Subsequent studies verified the expected high degree of linearity.

Inspection of Equation 1 shows that if all $X_i = Y_i$, the indeterminate form $r = 0/\sqrt{0}$ results. Computer programs discussed subsequently produce an unpredictable output when this occurs.

During the study of the Boston water system, two correlation computer programs were developed. The remainder of this report is devoted to a description of these programs and their use.

II. CORRELATION II PROGRAM

A. PROGRAM FUNCTIONS

The program CORR II is a simple, though powerful too for correlating sets of records for a number of gauging stations. The following simple example illustrates the use of CORR II.

Consider the following set of records for which complete or partial data may exist:

	Day Number		
Meter No. 4	106	107	212
Meter No. 5	106	107	212
Meter No. 10	106	107	212

In this example, Day No. 1 corresponds to January 1st. For each of the nine records, there are NHRS data points. In the Boston water study, the data points were hourly pipe discharges and pressures or hourly data from continuously recording venturi meters.

In this example, CORR II would compute correlation coefficients for the following pairs of records:

Meter 4	Day 106 to Day 107
Meter 4	Day 106 to Day 212
Meter 4	Day 107 to Day 212
Meter 5	Day 106 to Day 107
Meter 5	Day 106 to Day 212
Meter 5	Day 107 to Day 212
Meter 10	Day 106 to Day 107
Meter 10	Day 106 to Day 212
Meter 10	Day 107 to Day 212
Day 106	Meter 4 to Meter 5
Day 106	Meter 4 to Meter 10
Day 106	Meter 5 to Meter 10
Day 107	Meter 4 to Meter 5
Day 107	Meter 4 to Meter 10
Day 107	Meter 5 to Meter 10
Day 212	Meter 4 to Meter 5
Day 212	Meter 4 to Meter 10
Day 212	Meter 5 to Meter 10

It is seen that all physically meaningful correlation coefficients were computed. (For example, the record of Meter 4 on Day 106 was not correlated against the record of Meter 10 on Day 212.)

B. USING THE PROGRAM

The following information will be of use when using the program. Reference may be made to the sample data listing attached to this report.

The first data card contains, in order, the number of meters, NV, the number of days, ND, and the number of hours per day, NHRS. The Format is 3I3.

Following the first data card, the records to be analyzed must be arranged as follows:

Meter No. 4	Day 106	Record
Meter No. 4	Day 107	Record
Meter No. 4	Day 212	Record
Meter No. 5	Day 106	Record
Meter No. 5	Day 107	Record
Meter No. 5	Day 212	Record
Meter No. 10	Day 106	Record
Meter No. 10	Day 107	Record
Meter No. 10	Day 212	Record

For example, each of the nine input records must consist of NHRS data points.

Each of the nine records is punched on a set of two cards. The first card contains the first twelve hours of the record and the meter identification and day number. The second card contains the remaining data numbers in the record (hour 13 to hour NHRS). The records are punched on the first 72 columns of the cards in a 12F6.2 format. The last 8 columns of the first card must contain the following information:

a. Column 73 - a letter of the alphabet identifying the type of meter (format A1)
b. Columns 74-76 - the meter number in I3 format.
c. Column 77 - the letter A or B indicating whether the card is the first or second respectively in the set of two data cards per record (format A1)
d. Columns 78-80 - the day number in I3 format.

The above represents a complete set of input data. Additional sets of data may be stacked behind the first set of data. The program will complete calculations on one set before moving on to the next.

C. IN ITS PRESENT FORM, THE PROGRAM HAS THE FOLLOWING RESTRICTIONS:

1. $14 \leq NHRS \leq 24$
2. $NV \leq 30$
3. $ND \leq 30$

D. ADDITIONAL FEATURES OF CORR II

1. If a 0 is punched for any data point, the program will assume data for that hour is missing and will ignore it and the corresponding hour in the other record.

2. If a data value is 0 in reality, because of the above, it is necessary to punch 0.1 instead of 0. The program will interpret 0.1 as 0.00 and will not omit the data point from the record.

3. If a negative number is punched in column 1-6 on either of the two data cards comprising the record, the program will assume that all data for that card is missing. The corresponding hourly records will be dropped in the computation of correlation coefficients. Columns 70-80 must still contain the identification labels described above.

4. If all the data for a given record is unknown or missing, the program still requires two cards to appear. In this case, punch 0 in the location specified for the meter number of the first card.

E. OUTPUT

The program first prints the input record with the means removed. (The mean value of the printed record is 0.) Missing data is printed as ****. If any record is completely missing, it is not included in this output.

Following the echo print of the data, the listing of computed correlation coefficients appears. Each line of output contains a correlation coefficient obtained from the two records identified by gauge number (GAUGE) and date (DATE). The width of spread of data in each record appears in the column labeled WIDTH. Width is defined as the average of the sum of the absolute values of all data points in the record. For example,

$$\text{WIDTH} = \frac{1}{N} \sum_{i=1}^{N} | x_i |$$

The last column shows the number of hours (actual number of data points) used in the computation. For example, consider the following two 8-hour records:

Hour Number	Gauge A	Gauge B
1	3.0	missing
2	6.4	missing
3	9.5	7.2
4	8.0	3.6
5	missing	7.1
6	3.0	4.5
7	missing	2.1
8	missing	3.0

CORR II would compute a correlation coefficient for Gauge A and Gauge B using only the data for hours 3,4 and 6.

III. CORRELATION III PROGRAM

A. INTRODUCTION

CORR III performs the same analysis as CORR II on records which are more than 24 hours long. It should be noted that the data is stacked in a slightly different order from the data stack of CORR II.

B. USE OF THE PROGRAM

We defined NV as the number of field meters to which the meter of interest is to be correlated. (All NV + 1 meters must start on the same day.) For each meter we have ND days of data. Each day has 24 hourly data points. For example with ND = 3, each of the NV + 1 records consists of 72 data points. NHRS is therefore defined to be 24. Normally, the number of the data cards per meter, NCARDS, will be 2 ND.

The first data card must contain, in order, NV, ND, NHRS, NCARDS, in 4I3 format. Following the first data card, for each meter, the hourly records must be arranged in sequential order from hour 1 to hour 24 ND. The meter numbers themselves may be in any order.

The individual data points are punched in 12F6.1 format in the same manner for use with CORR II. The arrangement of the data set for a run with NV = 3, ND = 2, NCARDS = 4, is shown below:

Card Number		
1	--3--2-24--4	
2	Meter 1	Day 100 A.M.
3	"	" P.M.
4	"	Day 101 A.M.
5	"	" P.M.
6	Meter 2	Day 100 A.M.
7	"	" P.M.
8	"	Day 101 A.M.
9	"	" P.M.
10	Meter 3	Day 100 A.M.
11	"	" P.M.
12	"	Day 101 A.M.
13	"	" P.M.
14	Meter 99	Day 100 A.M.
15	"	" P.M.
16	"	Day 101 A.M.
17	"	" P.M.

On completion of the analysis, the program will look for more data and continue processing subsequent data stacks.

```
C
C     CORRELATION 2
C     FOR USE WITH PITOT GAUGING POINTS ALONE
C     USE FOR SERIAL AND CROSS CORRELATIONS
C     CROSS CORRELATION BETWEEN GAUGES OR DATES USING 24 HOUR DATA
C     NV=NO. OF GAUGES // ND=NO. OF DAYS // NHRS=NO. OF POINTS PER DAY
C     F(I,J,K)=PRESSURE OR DISCHARGE - INPUT F7.2 // OTHER DATA IS I3
C
      COMMON NUMV,D1,F,I,K,L,M,X,NHRS,LD
      DIMENSION NUMV(30,30),D1(30,30),LD(30,30),F(30,24,30)
      EQUIVALENCE (AVE,SUMF)
      EQUIVALENCE (NI,NH)
C
  100 FORMAT(1X,I3,F8.2)
  101 FORMAT(1H1,49HSERIES WITH MEANS SUBTRACTED  ( **** = NO ENTRY ))
  103 FORMAT(64H CORRELATION      ----- FROM -----      ------ TO ------
     1   NO OF)
  104 FORMAT(64H COEFFICIENT      GAUGE DATE WIDTH      GAUGE DATE WIDTH
     1   HOURS)
  105 FORMAT(1H1,28HCORRELATION OF GAUGE RECORDS)
  106 FORMAT(3I3)
  107 FORMAT(1X,5HGAUGE,I3,4H FOR,4A6)
  108 FORMAT(1H )
  109 FORMAT(I3,4A6)
  110 FORMAT(12F6.2,A1,I3,A1,I3)
  111 FORMAT(12F6.2)
  112 FORMAT(1X,11HGAUGE CODE ,A1,8H NUMBER ,I3,8H ON DAY ,I3)
  113 FORMAT(1X,I3,4X,4H****)
  114 FORMAT(12H HOUR   DATA)
  115 FORMAT(27H CHECK SERIES AGAINST INPUT)
  116 FORMAT(22H MAX INPUT IS 24 UNITS)
C
    1 READ 106,NV,ND,NHRS
      PRINT 101
      PRINT 108
      IF(NHRS-13)24,24,26
   26 IF(24-NHRS)28,30,30
   28 PRINT 116
   24 PRINT 115
   30 PRINT 108
C
      DO 25 I=1,NV
      DO 25 K=1,ND
      SUMF=0.0
      READ 110,(F(I,J,K),J=1,12),D1(I,K),NUMV(I,K),Z,LD(I,K)
      READ 111,(F(I,J,K),J=13,NHRS)
      IF(NUMV(I,K)) 25,25,4
    4 PRINT 108
      NUD=1
      DO 8 L=1,2
      IF(F(I,NUD,K)) 31,8,8
   31 NOD=NUD+11
      DO 7 J=NUD,NOD
    7 F(I,J,K)=0.0
      NUD=13

    8 CONTINUE
      PRINT 112,D1(I,K),NUMV(I,K),LD(I,K)
      PRINT 114
      X=NHRS
```

```
C
      DO 2 J=1,NHRS
      IF(F(I,J,K)-0.001)15,16,16
   15 X=X-1.0
      GO TO 2
   16 IF(F(I,J,K)-0.11)19,20,20
   19 GO TO 2
   20 SUMF=SUMF+F(I,J,K)
    2 CONTINUE
C
      AVE=SUMF/X
C
      DO 3 J=1,NHRS
      IF(F(I,J,K)-0.001)17,18,18
   17 PRINT 113,J
      F(I,J,K)=-1000.0
      GO TO 3
   18 IF(F(I,J,K)-0.11)21,22,22
   21 F(I,J,K)=-AVE
      GO TO 23
   22 F(I,J,K)=F(I,J,K)-AVE
   23 PRINT 100,J,F(I,J,K)
    3 CONTINUE
   25 CONTINUE
C
      X=NHRS
      PRINT 105
      PRINT 108
      PRINT 108
      PRINT 103
      PRINT 104
C
    5 DO 9 K=1,ND
      M=K
      DO 9 I=1,NV
      IF(NV-I)9,9,11
   11 NI=I+1
      IF(NUMV(I,K))9,9,41
   41 PRINT 108
      DO 13 L=NI,NV
      IF(NUMV(L,K))13,13,42
   42 CALL COMP (NUMV,D1,F,I,K,L,M,X,NHRS,LD)
   13 CONTINUE
    9 CONTINUE
C
    6 DO 10 I=1,NV
      PRINT 108
      L=I
      DO 10 K=1,ND
      IF(ND-K)10,10,12
   12 NH=K+1
      IF(NUMV(I,K))10,10,45
   45 CONTINUE
      DO 14 M=NH,ND
      IF(NUMV(I,M))14,14,46
   46 CALL COMP (NUMV,D1,F,I,K,L,M,X,NHRS,LD)
   14 CONTINUE
   10 CONTINUE
C
      GO TO 1
      END(1,1,0,0,0,0,1,1,0,0,0,0,0,0,0)
```

```
      SUBROUTINE COMP (NUMV,D1,F,I,K,L,M,X,NHRS,LD)
C
      COMMON NUMV,D1,F,I,K,L,M,X,NHRS,LD
      DIMENSION NUMV(30,1),D1(30,1),LD(30,1),F(30,240,1)
C
  102 FORMAT(2X,F8.4,2X,2(5X,A1,I4,1X,I4,F6.1),5X,I3)
C
    7 B=0.0
      C=0.0
      E=0.0
      G=0.0
      H=0.0
      Z1=0.0
      Z2=0.0
      X=NHRS
C
      DO 8 J=1,NHRS
      IF(F(I,J,K)+900.0)52,51,51
   51 IF(F(L,J,M)+900.0)52,55,55
   52 X=X-1.0
      GO TO 8
   55 H=F(I,J,K)*F(L,J,M)+H
      B=B+F(I,J,K)
      C=C+F(L,J,M)
      E=E+F(I,J,K)**2
      G=G+F(L,J,M)**2
      Z1=Z1+ABSF(F(I,J,K))
      Z2=Z2+ABSF(F(L,J,M))
    8 CONTINUE
C
      NOT=X
      Z1=Z1/X
      Z2=Z2/X
      ANUM=(H*X)-(B*C)
      DENO2=(G*X)-(C**2)
      DENO1=(E*X)-(B**2)
      RK=ANUM/(SQRTF(DENO1*DENO2))
      PRINT 102,RK,D1(I,K),NUMV(I,K),LD(I,K),Z1,D1(L,M),NUMV(L,M),
     1LD(L,M),Z2,NOT
C
      RETURN
      END(1,0,0,0,0,0,0,0,0,0,0,0,0,0,0)
```

```
C     CORRELATION 3
C     FOR USE WITH ALL MDC METERS AND ONE PITOT GAUGING POINT
C     CROSS CORRELATION BETWEEN GAUGES OR DATES USING 24 HOUR DATA
C     NV=NO. OF GAUGES // ND=NO. OF DAYS // NHRS=NO. OF POINTS PER DAY
C     F(I,J,K)=PRESSURE OR DISCHARGE - INPUT F7.2 // OTHER DATA IS I3
C
      COMMON NUMV,D1,F,I,K,L,M,X,NHRS,LD
      DIMENSION NUMV(30,1),D1(30,1),LD(30,1),F(30,240,1)
C
  100 FORMAT(I4,F8.2)
  101 FORMAT(1H1,49HSERIES WITH MEANS SUBTRACTED  ( **** = NO ENTRY ))
  103 FORMAT(64H CORRELATION      ----- FROM -----      ------ TO ------
     1   NO OF)
  104 FORMAT(64H COEFFICIENT      GAUGE DATE WIDTH      GAUGE DATE WIDTH
     1   HOURS)
  105 FORMAT(1H1,28HCORRELATION OF GAUGE RECORDS)
  106 FORMAT(4I3)
  108 FORMAT(1H )
  110 FORMAT(12F6.2,A1,I3,A1,I3)
  111 FORMAT(12F6.2)
  112 FORMAT(1X,11HGAUGE CODE ,A1,8H NUMBER ,I3,16H STARTING ON DAY,I4)
  113 FORMAT(1X,I3,4X,4H****)
  114 FORMAT(12H HOUR   DATA)
C
    1 READ 106,NV,ND,NHRS,NCARDS
      NGO=(2*ND)
      K=1
      NHRS=24*ND
      NVP=NV+1
      NV=NVP
      LHOLD=+1
      NXN=0
   28 PRINT 101
      PRINT 108
C
      DO 25 II=2,NVP
      IF(LHOLD)36,36,35
   35 I=II
      GO TO 40
   36 I=1
      NXN=NXN+1
   40 SUMF=0.0
      READ 110,(F(I,J,K),J=1,12),D1(I,K),NUMV(I,K),Z,LD(I,K)
      IF(LHOLD) 9001,9004,9004
 9001 IF(F(I,1,K)) 9004,9002,9002
 9002 DO 9003 J=1,12
      F(I,J,K)=SQRTF(F(I,J,K))*4.86
 9003 CONTINUE
 9004 CONTINUE
      PRINT 112,D1(I,K),NUMV(I,K),LD(I,K)
      PRINT 108
      DO 26 LL=2,NGO
      NAA=(12*(LL-1))+1
      NAB=NAA+11
```

```
   26 READ 111,(F(I,J,K),J=NAA,NAB)
      IF(LHOLD) 9011,9014,9014
 9011 IF(F(I,13,K)) 9014,9012,9012
 9012 DO 9013 J=13,24
      F(I,J,K)=SQRTF(F(I,J,K))*4.86
 9013 CONTINUE
 9014 CONTINUE
    4 DO 8 L=1,NGO
      NUD=(12(L-1))+1
      IF(F(I,NUD,K))31,8,8
   31 CONTINUE
      NOD=NUD+11
      DO 7 J=NUD,NOD
    7 F(I,J,K)=0.0
    8 CONTINUE
      PRINT 114
      X=NHRS
C
      DO 2 J=1,NHRS
      IF(F(I,J,K)-0.001)15,16,16
   15 X=X-1.0
      GO TO 2
   16 IF(F(I,J,K)-0.11)19,20,20
   19 GO TO 2
   20 SUMF=SUMF+F(I,J,K)
    2 CONTINUE
C
      AVE=SUMF/X
C
      DO 3 J=1,NHRS
      IF(F(I,J,K)-0.001)17,18,18
   17 PRINT 113,J
      F(I,J,K)=-1000.0
      GO TO 3
   18 IF(F(I,J,K)-0.11)21,22,22
   21 F(I,J,K)=-AVE
      GO TO 23
   22 F(I,J,K)=F(I,J,K)-AVE
   23 PRINT 100,J,F(I,J,K)
    3 CONTINUE
      IF(LHOLD)33,33,25
   25 CONTINUE
      LHOLD=-1
      GO TO 28
C
   33 X=NHRS
      PRINT 105
      PRINT 108
      PRINT 108
      PRINT 103
      PRINT 104
C
    5 CONTINUE
      M=K
      DO 9 I=1,NV
      IF(NV-I)9,9,11
```

```
   11 NI=I+1
      PRINT 108
      DO 13 L=NI,NV
      CALL COMP (NUMV,D1,F,I,K,L,M,X,NHRS,LD)



   13 CONTINUE
    9 CONTINUE
C
      IF(NXN-NCARDS) 28,1,1
      END
C
C
      SUBROUTINE COMP (NUMV,D1,F,I,K,L,M,X,NHRS,LD)
C
      COMMON NUMV,D1,F,I,K,L,M,X,NHRS,LD
      DIMENSION NUMV(30,1),D1(30,1),LD(30,1),F(30,240,1)
C
  102 FORMAT(2X,F8.4,2X,2(5X,A1,I4,1X,I4,F6.1),5X,I3)
C
    7 B=0.0
      C=0.0
      E=0.0
      G=0.0
      H=0.0
      Z1=0.0
      Z2=0.0
      X=NHRS
C
      DO 8 J=1,NHRS
      IF(F(I,J,K)+900.0)52,51,51
   51 IF(F(L,J,M)+900.0)52,55,55
   52 X=X-1.0
      GO TO 8
   55 H=F(I,J,K)*F(L,J,M)+H
      B=B+F(I,J,K)
      C=C+F(L,J,M)
      E=E+F(I,J,K)**2
      G=G+F(L,J,M)**2
      Z1=Z1+ABSF(F(I,J,K))
      Z2=Z2+ABSF(F(L,J,M))
    8 CONTINUE
C
      NOT=X
      Z1=Z1/X
      Z2=Z2/X
      ANUM=(H*X)-(B*C)
      DENO2=(G*X)-(C**2)
      DENO1=(E*X)-(B**2)
      RK=ANUM/(SQRTF(DENO1*DENO2))
      PRINT 102,RK,D1(I,K),NUMV(I,K),LD(I,K),Z1,D1(L,M),NUMV(L,M),
     1LD(L,M),Z2,NOT
C
      RETURN
      END
```

C. RESTRICTIONS - CORR III has the following restrictions:

1. NHRS $\equiv$ 24 only
2. NV $<$ 29
3. ND $\leq$ 10

$\therefore$ NCARDS = 20

D. ADDITIONAL FEATURES

CORR III has the same additional features that were described for CORR II.

E. OUTPUT

CORR III and CORR II have the same output format.

Boston Water

APPENDIX WSU4

SYNTHESIS OF WATER DISTRIBUTION SYSTEM DATA

ABSTRACT: A method for obtaining simultaneous synthetic trunk main records from non-simultaneous measurements of trunk main discharges is described. The method was used to analyze Pitometer gauging records.

SYNTHESIS OF WATER DISTRIBUTION SYSTEM DATA

by Charles D. D. Howard

I. INTRODUCTION

The public demand for water resembles, in some respects, the demand for electrical power. Water is used by individual householders, public recreational facilities, and by industrial and commercial users. Each type of user has his own daily demand curve. That is, at certain times of the day, he requires more water than at other times. In the electrical power generating industry, this demand variation or demand curve has long been recognized as a major characteristic of a power generation system. Indeed, consumers normally pay different rates for large blocks of power during peak hours and off hours. This rate structure recognizes that it is the peak consumption which determines many of the design criteria and the capital costs of a system. In this regard, water distribution systems are analagous to power grids.

In order to determine the best sizes and locations for new pipes in a water distribution system, it is necessary to know the time variation of demand throughout the system. Field measurements are therefore necessary. In waterworks practice, these measurements are normally made by gauging the 24-hour flow variation in selected important mains. If the city is quite large, it is generally not possible to perform all of these gaugings on the same day or even in the same month. Since water consumption is strongly dependent upon the time of year, it is obvious that some technique must be developed whereby these data may be referenced to a common day.

The purpose of this report is to describe the technique which was used to construct simultaneous synthetic trunk main records. The synthetic records were based on field measurements of trunk main 24-hour flows.

II. THE FIELD DATA

The trunk main gaugings were performed by the Pitometer Associates of New York, using their standard methods.[1] The result of this field work was a report containing hourly measured discharges past selected gauging points in pipes of the Boston water system. Approximately 50 such gauging points were studied. On the average, three or four gaugings were made per week during the four month period in which the field work was carried out.

In addition to the Pitometer data, the inputs to the water distribution network of the City of Boston were continuously monitored at venturi stations of the Metropolitan District Commission (MDC). These continuous MDC records were used to obtain discrete hourly discharges at all MDC stations. By the end of the field data gathering period, the following information was available for analysis.

---

[1]Present-Day Scope of Pitometer Surveys. Journal AWWA, 37:2:181, Feb. 1945, by E. Shaw Cole.

1. Hourly discharge readings taken over a 24-hour period at selected locations in the network. In general, three or four such gaugings were available for the same day.

2. Hourly discharges recorded at MDC venturi meter stations for every day on which Pitometer gauging data had been taken.

Preliminary plots of discharge vs. time showed that the trunk main gaugings taken by Pitometer Associates had the same general shape as the venturi records of the same day at certain of the MDC gauging stations. It was concluded therefore, that a possibility for linear simulation of the Pitometer data existed. Subsequent studies showed this to be the case.

III. THE METHOD

Since visual examination of the plotted Pitometer and MDC records showed, in some cases a striking similarity, it was decided to perform a more detailed analysis to determine the extent of the similarity. It was also desired to pinpoint those MDC meters which were most closely related to each specific Pitometer gauging point. The large amount of data to be handled in such a study indicated the need for extensive use of computers. Computer programs were therefore developed to do a detailed correlation analysis of these data, Appendix WSU3. The results of this analysis showed that each Pitometer gauging point was indeed highly correlated with certain MDC meters easily identifiable by the results of the correlation analysis. It was therefore concluded that a multiple linear regression equation could be developed to predict the discharge at Pitometer gauging points from measured MDC venturi records. The procedure followed in the development of these synthetic Pitometer records was conceptually simple.

A correlation coefficient was obtained for the particular Pitometer gauging record of interest and all MDC records which were available for the same day. It was generally found that three or four of the MDC records showed correlation coefficients greater than 0.95 for the 24-hourly discharges composing the records. A strong linear relationship was therefore indicated between the discharge past the Pitometer gauging point and the three or four MDC venturis. This meant that the discharge past the Pitometer gauging point could be obtained from a linear equation involving the discharges past the three MDC stations at the same hour. For example,

$$V2 = 1.089 + 0.437M60 - 0.601M76 - 0.031M77 \qquad (1)$$

Equation 1 indicates that the discharge past Pitometer gauging point 2 is predicated by multiplying the discharge measured at the same hour at MDC venturis 60,76, and 77 by the indicated coefficients and adding 1.089, the intercept of the equation. Hence, if this equation is deemed to be reliable, the discharge past the Pitometer gauging point can be predicted for any hour of any day for which the corresponding MDC records are available.

The mathematical details and the descriptions of computer programs are contained in the following sections. It should be appreciated that in work of this type, the analysis of the data and development of computer programs is relatively trivial compared to the task of gathering the data and coding it in a form suitable for analysis.

IV. THE CORRELATION STUDY

A comprehensive description of the method used to obtain linear correlation coefficients is described in Appendix WSU3. An extremely large amount of computer output was obtained from this analysis. The final MDC meters selected for regression analysis with Pitometer gauging points and the correlation coefficients obtained are shown in Table 1.

V. THE MULTIPLE REGRESSION ANALYSIS

A multiple linear regression equation was developed to relate each Pitometer gauging point to three selected MDC meters. [2]

The desired coefficients B_1, B_2, B_3, B_4 appear in the equation (Equation (1) above):

$$x_{1i} = B_1 + B_2 x_{2i} + B_3 x_{3i} + B_4 x_{4i} \qquad (1a)$$

for $i = 1,2,3, \ldots 24$

As shown by Chow the coefficients are found by solving the following four equations simultaneously:

$$B_2 \sum_i (\bar{x}_2 - x_{2_i})^2 + B_3 \sum_i (\bar{x}_2 - x_{2_i})(\bar{x}_3 - x_{3_i}) + B_4 \sum_i (\bar{x}_2 - x_{2_i})(\bar{x}_4 - x_{4_i}) = \sum_i (\bar{x}_1 - x_{1_i})(\bar{x}_2 - x_{2_i}) \qquad (2)$$

$$B_2 \sum_i (\bar{x}_2 - x_{2_i})(\bar{x}_3 - x_{3_i}) + B_3 \sum_i (\bar{x}_3 - x_{3_i}) + B_4 \sum_i (\bar{x}_3 - x_{3_i})(\bar{x}_4 - x_{4_i}) = \sum_i (\bar{x}_1 - x_{1_i})(\bar{x}_3 - x_{3_i}) \qquad (3)$$

$$B_2 \sum_i (\bar{x}_2 - x_{2_i})(\bar{x}_4 - x_{4_i}) + B_3 \sum_i (\bar{x}_3 - x_{3_i})(\bar{x}_4 - x_{4_i}) + B_4 \sum_i (\bar{x}_4 - x_{4_i}) = \sum_i (\bar{x}_1 - x_{1_i})(\bar{x}_4 - x_{4_i}) \qquad (4)$$

$$x_1 - B_2 x_2 - B_3 x_3 - B_4 x_4 = B_1 \qquad (5)$$

The above equations were programmed for a computer and solved simultaneously by the computer program REGRES.

[2] V.T. Chow, Handbook of Applied Hydrology, Section 8-II, Statistical and Probability Analysis of Hydrologic Data by V. M. Yevdjevich, pages 8-60, McGraw-Hill, 1964.

REGRES consists of a main program which sets up the above equations, and a subroutine, USSE1 which was used to solve the equations. The subroutine was borrowed from another program (SDP) used for water distribution systems network analysis.

The input data to REGRES consists of the four 24-hourly readings of the four records. The first set of 24 readings must be those of the Pitometer gauging point. The following three sets of 24 readings are those of the MDC meters. The data is assumed to be punched in a 12F6.1 format in the first 72 columns of each card (two cards are required for each 24-hour record). The meter number or Pitometer gauging point number appears in columns 74-76 and the day number in columns 77-80 on each card.

REGRES was written for the specific application and will not work if more than four records are involved in the analysis. It may work for less than four records. The program listing, together with a sample of the output is attached.

SYNREG

The computer program SYNREG was used to generate a 24-hour record for each Pitometer gauging point for the study day. The study day was chosen as a day on which all MDC records were complete and available for use in the regression equations used by SUNREG. Hence, with a complete set of regression equations and a complete set of MDC records for the study day, it was possible to generate a complete set of Pitometer data for that day. The justification for this procedure can be explained mathematically by saying that the correlation coefficients were very highly significant. From an engineering point of view, the justification was that no outstanding inconsistancies with the original data resulted from the synthesis procedure and where checks with actual data were possible, good agreement was achieved. Further justification came later after the overall computer network analysis had shown that computed pressure patterns and flow distributions in the network were in agreement with an overall appraisal of the network's performance.

Input to the program SYNREG consists of a data card containing the regression equation (punched as part of the output from REGRES) together with the three complete 24-hourly readings of the MDC meters appearing in the regression equation. The format used for the MDC data cards is the same as that described above.

A sample of the output and a program listing are attached.

```
C       MULTIPLE LINEAR REGRESSION OF 4 VARIABLES
C       X(1,J) IS DEPENDANT VARIABLE
C       EACH VARIABLE HAS 48 VALUES
C       SYMBOL IS 1-LETTER IN 'A' FORMAT
C       METER IS VARIABLE NUMBER (0 TO 999)
        COMMON NJ,DFDH,CORR
        DIMENSION X(4,48),XBAR(4),DX(4,48),METER(4),ICHK(48)
        DIMENSION SYMBOL(4),DFDH(3,4),CORR(3)
        DIMENSION CALC(48)
      1 DO 2 I=1,4
        READ 101,(X(I,J),J=1,12)
        READ 101,(X(I,J),J=13,24),SYMBOL(I),METER(I),JDAY
        READ 101,(X(I,J),J=25,36)
 2      READ 101,(X(I,J),J=37,48)
    210 FORMAT(2X,A1,I3,1X,I3)
    101 FORMAT(12F6.1,A1,I3,1X,I3)
        DO 11 J=1,48
        DO 10 I=1,4
        IF(X(I,J))13,13,12
     12 ICHK(J)=1
     10 CONTINUE
        GO TO 11
     13 ICHK(J)=0
     11 CONTINUE
        PRINT 401,SYMBOL(1),METER(1),SYMBOL(2),METER(2),SYMBOL(3),METER(3)
       1,SYMBOL(4),METER(4),JDAY
    401 FORMAT(1X,4(8H   METER,1X,A1,I3),19H  HOUR(FROM 1AM,DAY,I4,1H))
        DO 16 J=1,48
        IF(ICHK(J))16,16,17
     17 PRINT 402 ,X(1,J),X(2,J),X(3,J),X(4,J),J
     16 CONTINUE
    402 FORMAT(2X,F7.2,5X,F7.2,2(6X,F7.2),9X,I3)
        DO 4 I=1,4
        NVAR=0
        SUM=0.0
        DO 3 J=1,48
        IF(ICHK(J))3,3,30
     30 SUM=SUM+X(I,J)
        NVAR=NVAR+1
      3 CONTINUE
        VAR=NVAR
        XBAR(I)=SUM/VAR
      4 SUM=0.0
        DO 5 I=1,4
        DO 5 J=1,48
        IF(ICHK(J))5,5,50
     50 DX(I,J)=XBAR(I)-X(I,J)
      5 CONTINUE
        DO 6 I=1,3
        DO 6 J=1,4
      6 DFDH(I,J)=0.0
C       COMPUTE DIAGONAL OF DFDH
        DO 7 I=1,3
        DO 7 J=1,48
        IF(ICHK(J))7,7,70
     70 DFDH(I,I)=DFDH(I,I)+(DX(I+1,J)**2)
      7 CONTINUE
C       COMPUTE RHS
        DO 8 I=1,3
        DO 8 J=1,48
        IF(ICHK(J))8,8,80
     80 DFDH(I,4)=DFDH(I,4)+DX(1,J)*DX(I+1,J)
      8 CONTINUE
C       COMPUTE REST OF DFDH
        DO 90 J=1,48
        IF(ICHK(J))90,90,89
     89 DFDH(1,2)=DFDH(1,2)+(DX(2,J))*(DX(3,J))
        DFDH(1,3)=DFDH(1,3)+(DX(2,J))*(DX(4,J))
        DFDH(2,3)=DFDH(2,3)+(DX(3,J))*(DX(4,J))
        DFDH(2,1)=DFDH(1,2)
        DFDH(3,1)=DFDH(1,3)
        DFDH(3,2)=DFDH(2,3)
```

```
   90 CONTINUE
      NJ=3
      CALL USSE1
      B1=XBAR(1)-CORR(1)*XBAR(2)-CORR(2)*XBAR(3)-CORR(3)*XBAR(4)
      PRINT 200,SYMBOL(1),METER(1),B1,SYMBOL(2),METER(2),CORR(1),SYMBOL(
     13),METER(3),CORR(2),SYMBOL(4),METER(4),CORR(3),JDAY
      PUNCH 300,SYMBOL(1),METER(1),B1,SYMBOL(2),METER(2),CORR(1),
     1SYMBOL(3),METER(3),CORR(2),SYMBOL(4),METER(4),CORR(3)
  300 FORMAT(1X,A1,I3,1X,F10.6,1X,A1,I3,1X,F10.6,2X,A1,I3,1X,F10.6,2X,
     1A1,I3,1X,F10.6,2X,I4)
  200 FORMAT(1X,/1X,A1,I3,1H=,F12.6,1H+,A1,I3,1H(,F12.6,2H)+,A1,I3,1H(,
     1F12.6,2H)+,A1,I3,1H(,F12.6,5H) DAY,I4//)
      PRINT 606
  606 FORMAT(1X,26HHOUR  CALCULATED  OBSERVED)
      DO 601 I=1,48
      IF(ICHK(I))601,601,602
  602 CALC(I)=B1+CORR(1)*X(2,I)+CORR(2)*X(3,I)+CORR(3)*X(4,I)
      PRINT 603,I,CALC(I),X(1,I)
  601 CONTINUE
  603 FORMAT(1X,I3,4X,F6.2,6X,F6.2)
      PRINT 204,XBAR(1),XBAR(2),XBAR(3),XBAR(4)
  204 FORMAT(1X,28HMEANS USED FOR ANALYSIS  X1=,F6.2,2X,3HX2=,F6.2,2X,
     13HX3=,F6.2,2X,3HX4=,F6.2)
      PRINT 203
  203 FORMAT(1X,////////)
      GO TO 1
      END(1,0,0,0,0,0,0,0,0,0,0,0,0,0,0)

      SUBROUTINE USSE1

      SUBROUTINE USSE1
      COMMON NJ,DFDH,SOL
      DIMENSION DFDH(3,4),SOL(3),A(3,4)
 9415 FORMAT(24H USSE1 CANNOT SOLVE THIS)
      NJP1=NJ+1
      NSUB=0
  400 DO 401 J=1,NJ
      JPN=J+NSUB
      IF(NJ-JPN)402,403,403
  402 JPN=JPN-NJ
  403 DO 401 I=1,NJP1
  401 A(J,I)=DFDH(JPN,I)
      DO 404 J=1,NJ
      M=J+1
  405 AJJ=A(J,J)
      IF(ABSF(AJJ)-0.000001)406,407,407
  406 IF(NJ-M)409,408,408
  409 NSUB=NSUB+1
      IF(NJ-NSUB)414,400,400
  408 DO 410 I=1,NJP1
      DUMMY=A(J,I)
      A(J,I)=A(M,I)
  410 A(M,I)=DUMMY
      M=M+1
      GO TO 405
  407 DO 411 L=J,NJP1
  411 A(J,L)=A(J,L)/AJJ
      DO 404 NROW=1,NJ
      IF(NROW-J)412,404,412
  412 AB=A(NROW,J)
      DO 413 K=J,NJP1
  413 A(NROW,K)=A(NROW,K)-AB*A(J,K)
  404 CONTINUE
      GO TO 416
  414 PRINT 9415
  431 FORMAT(2X,E14.7)
      DO 419 JJ=1,NJP1
      DO 419 I=1,NJ
  419 PRINT 431,DFDH(I,JJ)
      CALL EXIT
  416 DO 417 J=1,NJ
      JMN=J-NSUB
      IF(JMN)420,420,417
  420 JMN=JMN+NJ
  417 SOL(J)=A(JMN,NJP1)
  418 RETURN
      END(1,0,0,0,0,0,0,0,0,0,0,0,0,0,0)
```

```
C       SYNREG
C       THIS PROGRAM USES THE 24 HOUR RECORDS OF THREE METERS PLUS THE
C       MULTIPLE LINEAR REGRESSION EQUATION FOR THEIR RELATIONSHIP WITH A
C       FOURTH METER TO GENERATE A SYNTHETIC 24 HOUR RECORD FOR THE FOURTH
C       THE OUTPUT IS PRINTED AND PUNCHED ON CARDS WITH **S** IN COLUMN 73
C       INPUT ALL MDC METERS AT ONCE FOR THE SAME DAY
C       METER NO. IS I, NO. OF METERS IS N
  400   FORMAT(1X,20HREGRESSION EQUATION.,2X,A1,I3,1H=,F9.5,1H+,A1,I3,1H(,
       1F9.5,2H)+,A1,I3,1H(,F9.5,2H)+,A1,I3,1H(,F9.5,1H))
  101   FORMAT(12F6.1,5X,I3)
  102   FORMAT(12F6.1,1HS,I3,1HA,I3)
  103   FORMAT(12F6.1,1HS,I3,1HB,I3)
  200   FORMAT(1X,A1,I3,1X,F10.6,1X,A1,I3,1X,F10.6,2X,A1,I3,1X,F10.6,2X,
       1A1,I3,1X,F10.6,2X,I4)
  201   FORMAT(1X,/////,1X,19HSYNTHETIC RECORD    ,A1,I3,3HDAY,I4)
  202   FORMAT(1X,11HDATA USED  ,3(2X,A1,I3))
  203   FORMAT(1X,35HDISCHARGE(MGD)   HOUR(FROM 1AM, DAY,I3,1H),3(2X,A1,I3
       1,1X))
  300   FORMAT(3X,F6.2,11X,I3,17X,3(1X,F6.2))
  100   FORMAT(I4)
        DIMENSION X(200,24),METER(4),ICHK(24),SYMBOL(4),CORR(3),Y(24)
  1     READ 100,N
        DO 3 K=1,200
        DO 3 J=1,24
  3     X(K,J)=0.0
        DO 2 II=1,N
        READ 100,I
        READ 101,(X(I,J),J=1,12),JDAY
  2     READ 101,(X(I,J),J=13,24)
        DO 55 J=1,24
  55    Y(J)=0.0
        ICONT=0
        READ 100,NEQN
  17    CONTINUE
        READ 200,SYMBOL(1),METER(1),B1,SYMBOL(2),METER(2),CORR(1),
       1SYMBOL(3),METER(3),CORR(2),SYMBOL(4),METER(4),CORR(3)
        PRINT 201,SYMBOL(1),METER(1),JDAY
        PRINT 203,JDAY,SYMBOL(2),METER(2),SYMBOL(3),METER(3),SYMBOL(4),MET
       1ER(4)
        L=METER(2)
        LL=METER(3)
        LLL=METER(4)
        DO 11 J=1,24
        IF(X(L,J))13,13,22
   22   IF(X(LL,J))13,13,23
   23   IF(X(LLL,J))13,13,12
   12   ICHK(J)=1
        GO TO 11
   13   ICHK(J)=0
   11   CONTINUE
        DO 16 J=1,24
        IF(ICHK(J))16,16,15
  15    Y(J)=B1+X(L,J)*CORR(1)+X(LL,J)*CORR(2)+X(LLL,J)*CORR(3)
        PRINT 300, Y(J),J,X(L,J),X(LL,J),X(LLL,J)
  16    CONTINUE
        PUNCH 102, (Y(J),J=1,12),METER(1),JDAY
        PUNCH 103, (Y(J),J=13,24),METER(1),JDAY
        PRINT 400,SYMBOL(1),METER(1),B1,SYMBOL(2),METER(2),CORR(1),SYMBOL(
       13),METER(3),CORR(2),SYMBOL(4),METER(4),CORR(3)
        ICONT=ICONT+1
        IF(NEQN-ICONT)1,1,17
        END(1,1,0,0,0,0,1,1,0,0,0,0,0,0,0)
```

SYNTHETIC RECORD V 2DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 60	M 76	M 77
5.96	1	16.30	3.40	7.30
5.81	2	15.80	3.30	7.00
5.52	3	15.00	3.20	6.80
5.30	4	14.50	3.20	6.80
4.88	5	14.00	3.50	7.50
4.34	6	14.00	4.30	9.50
4.31	7	15.00	5.00	11.00
5.22	8	18.00	5.60	12.50
6.78	9	22.00	5.90	12.80
7.11	10	23.50	6.40	13.50
7.32	11	24.00	6.40	14.00
7.76	12	25.00	6.40	14.00
8.18	13	26.00	6.40	14.30
8.18	14	26.00	6.40	14.50
8.39	15	26.00	6.10	13.50
8.59	16	26.00	5.80	13.00
8.28	17	25.00	5.60	12.50
7.92	18	24.00	5.50	12.00
7.80	19	23.00	5.00	11.50
7.50	20	22.00	4.80	11.00
7.41	21	21.50	4.60	10.50
7.27	22	21.00	4.50	10.00
6.98	23	20.00	4.30	9.00
6.36	24	18.00	3.90	8.50

REGRESSION EQUATION. V 2= 1.08913+M 60(0.43791)+M 76(-0.60106)+M 77(-0.03101)

SYNTHETIC RECORD V 6DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 76	M 77	M101
2.91	1	3.40	7.30	1.00
2.87	2	3.30	7.00	1.00
2.82	3	3.20	6.80	1.00
2.91	4	3.20	6.80	1.50
3.15	5	3.50	7.50	2.00
3.69	6	4.30	9.50	3.00
4.33	7	5.00	11.00	4.50
4.60	8	5.60	12.50	4.50
4.84	9	5.90	12.80	4.50
5.28	10	6.40	13.50	5.00
5.16	11	6.40	14.00	5.00
5.07	12	6.40	14.00	4.50
5.00	13	6.40	14.30	4.50
4.96	14	6.40	14.50	4.50
4.94	15	6.10	13.50	4.80
4.65	16	5.80	13.00	4.30
4.51	17	5.60	12.50	4.00
4.52	18	5.50	12.00	4.00
4.03	19	5.00	11.50	3.50
3.91	20	4.80	11.00	3.30
3.76	21	4.60	10.50	3.00
3.59	22	4.50	10.00	2.00
3.49	23	4.30	9.00	1.30
3.14	24	3.90	8.50	1.00

REGRESSION EQUATION. V 6= 0.93052+M 76(1.02352)+M 77(-0.23133)+M101(0.18428)

SYNTHETIC RECORD V 7DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 44	M 76	M 77
10.50	1	9.50	3.40	7.30
9.97	2	9.00	3.30	7.00
9.63	3	9.00	3.20	6.80
9.63	4	9.00	3.20	6.80
10.80	5	9.00	3.50	7.50
14.40	6	12.00	4.30	9.50
17.23	7	15.00	5.00	11.00
19.81	8	16.00	5.60	12.50
20.54	9	17.30	5.90	12.80
21.89	10	18.00	6.40	13.50
22.70	11	19.00	6.40	14.00
22.66	12	18.50	6.40	14.00
23.13	13	19.00	6.40	14.30
23.42	14	19.00	6.40	14.50
21.67	15	17.50	6.10	13.50
20.74	16	17.00	5.80	13.00
19.86	17	16.50	5.60	12.50
19.04	18	16.00	5.50	12.00
18.02	19	15.80	5.00	11.50
17.07	20	14.50	4.80	11.00
16.19	21	14.00	4.60	10.50
15.42	22	14.00	4.50	10.00
13.73	23	12.50	4.30	9.00
12.65	24	11.00	3.90	8.50

REGRESSION EQUATION. V 7= -2.78582+M 44(0.09313)+M 76(0.58239)+M 77(1.42792)

SYNTHETIC RECORD V 8DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 44	M 76	M 77
8.35	1	9.50	3.40	7.30
8.10	2	9.00	3.30	7.00
7.98	3	9.00	3.20	6.80
7.98	4	9.00	3.20	6.80
8.36	5	9.00	3.50	7.50
10.05	6	12.00	4.30	9.50
11.54	7	15.00	5.00	11.00
12.53	8	16.00	5.60	12.50
13.08	9	17.30	5.90	12.80
13.72	10	18.00	6.40	13.50
14.08	11	19.00	6.40	14.00
13.97	12	18.50	6.40	14.00
14.17	13	19.00	6.40	14.30
14.22	14	19.00	6.40	14.50
13.44	15	17.50	6.10	13.50
13.01	16	17.00	5.80	13.00
12.64	17	16.50	5.60	12.50
12.33	18	16.00	5.50	12.00
11.85	19	15.80	5.00	11.50
11.31	20	14.50	4.80	11.00
10.94	21	14.00	4.60	10.50
10.74	22	14.00	4.50	10.00
10.02	23	12.50	4.30	9.00
9.31	24	11.00	3.90	8.50

REGRESSION EQUATICN. V 8= 2.21277+M 44(0.21948)+M 76(0.59255)+M 77(0.27919)

SYNTHETIC RECORD V 9DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 44	M 76	M 77
1.43	1	9.50	3.40	7.30
1.36	2	9.00	3.30	7.00
1.35	3	9.00	3.20	6.80
1.35	4	9.00	3.20	6.80
1.40	5	9.00	3.50	7.50
1.85	6	12.00	4.30	9.50
2.28	7	15.00	5.00	11.00
2.49	8	16.00	5.60	12.50
2.67	9	17.30	5.90	12.80
2.81	10	18.00	6.40	13.50
2.93	11	19.00	6.40	14.00
2.87	12	18.50	6.40	14.00
2.94	13	19.00	6.40	14.30
2.94	14	19.00	6.40	14.50
2.72	15	17.50	6.10	13.50
2.63	16	17.00	5.80	13.00
2.54	17	16.50	5.60	12.50
2.46	18	16.00	5.50	12.00
2.38	19	15.80	5.00	11.50
2.21	20	14.50	4.80	11.00
2.12	21	14.00	4.60	10.50
2.10	22	14.00	4.50	10.00
1.89	23	12.50	4.30	9.00
1.68	24	11.00	3.90	8.50

REGRESSION EQUATION. V 9= -0.11296+M 44(0.10864)+M 76(0.09587)+M 77(0.02601)

SYNTHETIC RECORD V 10DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 5	M 60	M101
7.57	1	14.00	16.30	1.00
7.19	2	13.00	15.80	1.00
7.02	3	13.00	15.00	1.00
7.08	4	13.00	14.50	1.50
7.14	5	13.00	14.00	2.00
8.28	6	16.00	14.00	3.00
10.07	7	20.00	15.00	4.50
10.96	8	21.00	18.00	4.50
12.34	9	23.00	22.00	4.50
13.09	10	24.00	23.50	5.00
13.33	11	24.50	24.00	5.00
13.24	12	24.00	25.00	4.50
13.44	13	24.00	26.00	4.50
13.44	14	24.00	26.00	4.50
13.54	15	24.00	26.00	4.80
13.38	16	24.00	26.00	4.30
12.66	17	22.50	25.00	4.00
12.32	18	22.00	24.00	4.00
11.82	19	21.50	23.00	3.50
11.27	20	20.50	22.00	3.30
10.66	21	19.00	21.50	3.00
9.82	22	17.50	21.00	2.00
8.98	23	16.00	20.00	1.30
8.06	24	14.50	18.00	1.00

REGRESSION EQUATION. V 10= 0.02332+M 5(0.27534)+M 60(0.20673)+M101(0.31929)

SYNTHETIC RECORD V 11DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 44	M 60	M 77
4.09	1	9.50	16.30	7.30
3.87	2	9.00	15.80	7.00
3.83	3	9.00	15.00	6.80
3.96	4	9.00	14.50	6.80
4.98	5	9.00	14.00	7.50
7.38	6	12.00	14.00	9.50
8.88	7	15.00	15.00	11.00
9.94	8	16.00	18.00	12.50
9.20	9	17.30	22.00	12.80
9.65	10	18.00	23.50	13.50
10.11	11	19.00	24.00	14.00
9.87	12	18.50	25.00	14.00
9.96	13	19.00	26.00	14.30
10.21	14	19.00	26.00	14.50
9.01	15	17.50	26.00	13.50
8.40	16	17.00	26.00	13.00
8.05	17	16.50	25.00	12.50
7.71	18	16.00	24.00	12.00
7.35	19	15.80	23.00	11.50
7.04	20	14.50	22.00	11.00
6.56	21	14.00	21.50	10.50
6.07	22	14.00	21.00	10.00
5.13	23	12.50	20.00	9.00
5.09	24	11.00	18.00	8.50

REGRESSION EQUATION. V 11= -0.39744+M 44(-0.04066)+M 60(-0.26595)+M 77(1.26169)

SYNTHETIC RECORD V 13DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 44	M 60	M 77
0.86	1	9.50	16.30	7.30
0.84	2	9.00	15.80	7.00
0.81	3	9.00	15.00	6.80
0.81	4	9.00	14.50	6.80
0.85	5	9.00	14.00	7.50
0.97	6	12.00	14.00	9.50
1.05	7	15.00	15.00	11.00
1.19	8	16.00	18.00	12.50
1.25	9	17.30	22.00	12.80
1.31	10	18.00	23.50	13.50
1.34	11	19.00	24.00	14.00
1.36	12	18.50	25.00	14.00
1.39	13	19.00	26.00	14.30
1.41	14	19.00	26.00	14.50
1.35	15	17.50	26.00	13.50
1.32	16	17.00	26.00	13.00
1.28	17	16.50	25.00	12.50
1.23	18	16.00	24.00	12.00
1.18	19	15.80	23.00	11.50
1.15	20	14.50	22.00	11.00
1.11	21	14.00	21.50	10.50
1.06	22	14.00	21.00	10.00
1.00	23	12.50	20.00	9.00
0.95	24	11.00	18.00	8.50

REGRESSION EQUATION. V 13= 0.22031+M 44(-0.01555)+M 60(0.01277)+M 77(0.07939)

SYNTHETIC RECORD V 14DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 44	M 60	M 77
1.69	1	9.50	16.30	7.30
1.62	2	9.00	15.80	7.00
1.64	3	9.00	15.00	6.80
1.69	4	9.00	14.50	6.80
1.96	5	9.00	14.00	7.50
2.71	6	12.00	14.00	9.50
3.20	7	15.00	15.00	11.00
3.42	8	16.00	18.00	12.50
3.17	9	17.30	22.00	12.80
3.27	10	18.00	23.50	13.50
3.42	11	19.00	24.00	14.00
3.31	12	18.50	25.00	14.00
3.32	13	19.00	26.00	14.30
3.39	14	19.00	26.00	14.50
3.01	15	17.50	26.00	13.50
2.83	16	17.00	26.00	13.00
2.75	17	16.50	25.00	12.50
2.67	18	16.00	24.00	12.00
2.60	19	15.80	23.00	11.50
2.49	20	14.50	22.00	11.00
2.37	21	14.00	21.50	10.50
2.26	22	14.00	21.00	10.00
1.98	23	12.50	20.00	9.00
1.96	24	11.00	18.00	8.50

REGRESSION EQUATION. V 14= 0.60348+M 44(0.03786)+M 60(-0.09799)+M 77(0.31797)

SYNTHETIC RECORD V 14DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 60	M 76	M101
1.78	1	16.30	3.40	1.00
1.73	2	15.80	3.30	1.00
1.67	3	15.00	3.20	1.00
1.65	4	14.50	3.20	1.50
1.75	5	14.00	3.50	2.00
2.05	6	14.00	4.30	3.00
2.31	7	15.00	5.00	4.50
2.60	8	18.00	5.60	4.50
2.79	9	22.00	5.90	4.50
3.00	10	23.50	6.40	5.00
3.01	11	24.00	6.40	5.00
3.04	12	25.00	6.40	4.50
3.06	13	26.00	6.40	4.50
3.06	14	26.00	6.40	4.50
2.93	15	26.00	6.10	4.80
2.82	16	26.00	5.80	4.30
2.73	17	25.00	5.60	4.00
2.68	18	24.00	5.50	4.00
2.47	19	23.00	5.00	3.50
2.38	20	22.00	4.80	3.30
2.30	21	21.50	4.60	3.00
2.27	22	21.00	4.50	2.00
2.19	23	20.00	4.30	1.30
2.00	24	18.00	3.90	1.00

REGRESSION EQUATION. V 14= 0.16405+M 60(0.01666)+M 76(0.40078)+M101(-0.02312)

SYNTHETIC RECORD V 15DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 48	M 76	M 78
2.62	1	3.20	3.40	2.40
2.76	2	3.60	3.30	2.40
2.74	3	3.60	3.20	2.40
2.58	4	3.20	3.20	2.40
2.63	5	3.60	3.50	2.60
3.07	6	5.00	4.30	2.90
3.18	7	5.60	5.00	3.20
3.27	8	6.00	5.60	3.40
3.31	9	6.60	5.90	3.70
3.32	10	6.60	6.40	3.80
3.25	11	6.20	6.40	3.70
3.34	12	6.00	6.40	3.50
3.41	13	6.20	6.40	3.50
3.65	14	6.80	6.40	3.50
3.52	15	6.40	6.10	3.40
4.33	16	5.60	5.80	2.00
3.38	17	5.20	5.60	2.90
3.33	18	4.90	5.50	2.80
3.20	19	4.80	5.00	2.80
3.16	20	4.80	4.80	2.80
2.93	21	4.30	4.60	2.80
3.20	22	4.40	4.50	2.50
3.25	23	4.40	4.30	2.40
3.02	24	4.00	3.90	2.40

REGRESSION EQUATION. V 15= 2.76390+M 48(0.38638)+M 76(0.18447)+M 78(-0.83576)

SYNTHETIC RECORD V 17DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 5	M 48	M101
2.74	1	14.00	3.20	1.00
2.70	2	13.00	3.60	1.00
2.70	3	13.00	3.60	1.00
2.61	4	13.00	3.20	1.50
2.73	5	13.00	3.60	2.00
3.57	6	16.00	5.00	3.00
4.37	7	20.00	5.60	4.50
4.62	8	21.00	6.00	4.50
5.07	9	23.00	6.60	4.50
5.24	10	24.00	6.60	5.00
5.21	11	24.50	6.20	5.00
5.06	12	24.00	6.00	4.50
5.12	13	24.00	6.20	4.50
5.27	14	24.00	6.80	4.50
5.18	15	24.00	6.40	4.80
4.95	16	24.00	5.60	4.30
4.62	17	22.50	5.20	4.00
4.47	18	22.00	4.90	4.00
4.35	19	21.50	4.80	3.50
4.19	20	20.50	4.80	3.30
3.83	21	19.00	4.30	3.00
3.60	22	17.50	4.40	2.00
3.36	23	16.00	4.40	1.30
3.02	24	14.50	4.00	1.00

REGRESSION EQUATION. V 17= -0.18798+M 5(0.14739)+M 48(0.25994)+M101(0.03445)

SYNTHETIC RECORD V 18DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 76	M 77	M101
1.65	1	3.40	7.30	1.00
1.61	2	3.30	7.00	1.00
1.57	3	3.20	6.80	1.00
1.63	4	3.20	6.80	1.50
1.78	5	3.50	7.50	2.00
2.18	6	4.30	9.50	3.00
2.58	7	5.00	11.00	4.50
2.80	8	5.60	12.50	4.50
2.89	9	5.90	12.80	4.50
3.09	10	6.40	13.50	5.00
3.12	11	6.40	14.00	5.00
3.07	12	6.40	14.00	4.50
3.08	13	6.40	14.30	4.50
3.09	14	6.40	14.50	4.50
3.00	15	6.10	13.50	4.80
2.85	16	5.80	13.00	4.30
2.75	17	5.60	12.50	4.00
2.70	18	5.50	12.00	4.00
2.50	19	5.00	11.50	3.50
2.41	20	4.80	11.00	3.30
2.30	21	4.60	10.50	3.00
2.15	22	4.50	10.00	2.00
1.98	23	4.30	9.00	1.30
1.83	24	3.90	8.50	1.00

REGRESSION EQUATION. V 18= 0.35998+M 76(0.24603)+M 77(0.04741)+M101(0.10405)

SYNTHETIC RECORD V 19DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 60	M 76	M101
2.94	1	16.30	3.40	1.00
2.89	2	15.80	3.30	1.00
2.86	3	15.00	3.20	1.00
2.90	4	14.50	3.20	1.50
3.20	5	14.00	3.50	2.00
3.89	6	14.00	4.30	3.00
4.42	7	15.00	5.00	4.50
4.72	8	18.00	5.60	4.50
4.68	9	22.00	5.90	4.50
5.00	10	23.50	6.40	5.00
4.96	11	24.00	6.40	5.00
4.89	12	25.00	6.40	4.50
4.81	13	26.00	6.40	4.50
4.81	14	26.00	6.40	4.50
4.54	15	26.00	6.10	4.80
4.28	16	26.00	5.80	4.30
4.18	17	25.00	5.60	4.00
4.17	18	24.00	5.50	4.00
3.81	19	23.00	5.00	3.50
3.71	20	22.00	4.80	3.30
3.58	21	21.50	4.60	3.00
3.54	22	21.00	4.50	2.00
3.45	23	20.00	4.30	1.30
3.25	24	18.00	3.90	1.00

REGRESSION EQUATION. V 19= 1.19591+M 60(-0.07752)+M 76(0.88810)+M101(-0.01186)

SYNTHETIC RECORD V 20DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 76	M 77	M101
0.93	1	3.40	7.30	1.00
0.93	2	3.30	7.00	1.00
0.94	3	3.20	6.80	1.00
1.02	4	3.20	6.80	1.50
1.08	5	3.50	7.50	2.00
1.19	6	4.30	9.50	3.00
1.38	7	5.00	11.00	4.50
1.34	8	5.60	12.50	4.50
1.29	9	5.90	12.80	4.50
1.31	10	6.40	13.50	5.00
1.34	11	6.40	14.00	5.00
1.25	12	6.40	14.00	4.50
1.27	13	6.40	14.30	4.50
1.28	14	6.40	14.50	4.50
1.34	15	6.10	13.50	4.80
1.29	16	5.80	13.00	4.30
1.26	17	5.60	12.50	4.00
1.25	18	5.50	12.00	4.00
1.24	19	5.00	11.50	3.50
1.22	20	4.80	11.00	3.30
1.19	21	4.60	10.50	3.00
1.01	22	4.50	10.00	2.00
0.88	23	4.30	9.00	1.30
0.89	24	3.90	8.50	1.00

REGRESSION EQUATION. V 20= 1.06642+M 76(-0.20651)+M 77(0.05379)+M101(0.16823)

SYNTHETIC RECORD V 21DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 76	M 77	M 94
1.86	1	3.40	7.30	11.00
1.79	2	3.30	7.00	10.50
1.73	3	3.20	6.80	10.00
1.73	4	3.20	6.80	10.00
1.90	5	3.50	7.50	11.00
2.38	6	4.30	9.50	14.00
2.82	7	5.00	11.00	17.00
3.15	8	5.60	12.50	18.50
3.35	9	5.90	12.80	20.00
3.66	10	6.40	13.50	22.00
3.67	11	6.40	14.00	22.50
3.68	12	6.40	14.00	23.00
3.64	13	6.40	14.30	22.00
3.64	14	6.40	14.50	22.00
3.51	15	6.10	13.50	22.00
3.34	16	5.80	13.00	21.50
3.25	17	5.60	12.50	21.50
3.17	18	5.50	12.00	20.50
2.91	19	5.00	11.50	20.00
2.80	20	4.80	11.00	19.50
2.67	21	4.60	10.50	18.50
2.58	22	4.50	10.00	17.00
2.41	23	4.30	9.00	14.50
2.16	24	3.90	8.50	13.00

REGRESSION EQUATION. V 21= -0.13015+M 76(0.52170)+M 77(-0.02322)+M 94(0.03484)

SYNTHETIC RECORD V 22DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 7	M 64	M 77
0.23	1	2.20	1.60	7.30
0.25	2	2.10	1.60	7.00
0.24	3	2.10	1.50	6.80
0.23	4	2.00	1.50	6.80
0.21	5	2.40	1.50	7.50
0.13	6	3.40	1.50	9.50
0.32	7	4.20	2.40	11.00
0.47	8	5.30	3.00	12.50
0.56	9	5.40	3.40	12.80
0.49	10	5.60	3.30	13.50
0.59	11	5.80	3.80	14.00
0.51	12	5.80	3.50	14.00
0.50	13	5.50	3.70	14.30
0.48	14	5.50	3.70	14.50
0.50	15	5.30	3.50	13.50
0.59	16	5.20	3.70	13.00
0.55	17	5.30	3.30	12.50
0.70	18	5.50	3.60	12.00
0.75	19	6.00	3.40	11.50
0.73	20	6.30	3.00	11.00
0.71	21	6.20	2.80	10.50
0.64	22	5.60	2.60	10.00
0.62	23	4.60	2.60	9.00
0.43	24	4.00	2.00	8.50

REGRESSION EQUATION. V 22= 0.24946+M 7(0.11655)+M 64(0.26857)+M 77(-0.09650)

SYNTHETIC RECORD V 23DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 76	M 94	M101
1.03	1	3.40	11.00	1.00
0.96	2	3.30	10.50	1.00
0.89	3	3.20	10.00	1.00
0.76	4	3.20	10.00	1.50
0.81	5	3.50	11.00	2.00
1.04	6	4.30	14.00	3.00
1.11	7	5.00	17.00	4.50
1.43	8	5.60	18.50	4.50
1.64	9	5.90	20.00	4.50
1.82	10	6.40	22.00	5.00
1.85	11	6.40	22.50	5.00
2.01	12	6.40	23.00	4.50
1.95	13	6.40	22.00	4.50
1.95	14	6.40	22.00	4.50
1.76	15	6.10	22.00	4.80
1.74	16	5.80	21.50	4.30
1.74	17	5.60	21.50	4.00
1.64	18	5.50	20.50	4.00
1.55	19	5.00	20.00	3.50
1.50	20	4.80	19.50	3.30
1.44	21	4.60	18.50	3.00
1.56	22	4.50	17.00	2.00
1.51	23	4.30	14.50	1.30
1.34	24	3.90	13.00	1.00

REGRESSION EQUATION. V 23= -0.68326+M 76(0.37899)+M 94(0.06204)+M101(-0.25737)

SYNTHETIC RECORD V 26DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 44	M 76	M 77
0.48	1	9.50	3.40	7.30
0.46	2	9.00	3.30	7.00
0.45	3	9.00	3.20	6.80
0.45	4	9.00	3.20	6.80
0.49	5	9.00	3.50	7.50
0.59	6	12.00	4.30	9.50
0.68	7	15.00	5.00	11.00
0.75	8	16.00	5.60	12.50
0.78	9	17.30	5.90	12.80
0.82	10	18.00	6.40	13.50
0.84	11	19.00	6.40	14.00
0.84	12	18.50	6.40	14.00
0.85	13	19.00	6.40	14.30
0.86	14	19.00	6.40	14.50
0.81	15	17.50	6.10	13.50
0.78	16	17.00	5.80	13.00
0.75	17	16.50	5.60	12.50
0.73	18	16.00	5.50	12.00
0.70	19	15.80	5.00	11.50
0.67	20	14.50	4.80	11.00
0.64	21	14.00	4.60	10.50
0.62	22	14.00	4.50	10.00
0.58	23	12.50	4.30	9.00
0.54	24	11.00	3.90	8.50

REGRESSION EQUATION. V 26= 0.08130+M 44(0.00238)+M 76(0.03714)+M 77(0.03395)

SYNTHETIC RECORD V 26DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 60	M 77	M101
0.49	1	16.30	7.30	1.00
0.49	2	15.80	7.00	1.00
0.48	3	15.00	6.80	1.00
0.49	4	14.50	6.80	1.50
0.52	5	14.00	7.50	2.00
0.60	6	14.00	9.50	3.00
0.70	7	15.00	11.00	4.50
0.75	8	18.00	12.50	4.50
0.78	9	22.00	12.80	4.50
0.82	10	23.50	13.50	5.00
0.83	11	24.00	14.00	5.00
0.82	12	25.00	14.00	4.50
0.83	13	26.00	14.30	4.50
0.83	14	26.00	14.50	4.50
0.83	15	26.00	13.50	4.80
0.80	16	26.00	13.00	4.30
0.77	17	25.00	12.50	4.00
0.75	18	24.00	12.00	4.00
0.72	19	23.00	11.50	3.50
0.69	20	22.00	11.00	3.30
0.67	21	21.50	10.50	3.00
0.62	22	21.00	10.00	2.00
0.56	23	20.00	9.00	1.30
0.53	24	18.00	8.50	1.00

REGRESSION EQUATION. V 26= 0.21362+M 60(0.00606)+M 77(0.01930)+M101(0.04067)

SYNTHETIC RECORD V 52DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 7	M 48	M 78
1.15	1	2.20	3.20	2.40
1.23	2	2.10	3.60	2.40
1.23	3	2.10	3.60	2.40
1.14	4	2.00	3.20	2.40
1.19	5	2.40	3.60	2.60
1.46	6	3.40	5.00	2.90
1.55	7	4.20	5.60	3.20
1.65	8	5.30	6.00	3.40
1.69	9	5.40	6.60	3.70
1.68	10	5.60	6.60	3.80
1.63	11	5.80	6.20	3.70
1.65	12	5.80	6.00	3.50
1.68	13	5.50	6.20	3.50
1.80	14	5.50	6.80	3.50
1.74	15	5.30	6.40	3.40
2.00	16	5.20	5.60	2.00
1.64	17	5.30	5.20	2.90
1.62	18	5.50	4.90	2.80
1.63	19	6.00	4.80	2.80
1.65	20	6.30	4.80	2.80
1.54	21	6.20	4.30	2.80
1.61	22	5.60	4.40	2.50
1.57	23	4.60	4.40	2.40
1.44	24	4.00	4.00	2.40

REGRESSION EQUATION. V 52= 1.06009+M 7(0.06897)+M 48(0.21432)+M 78(-0.31196)

SYNTHETIC RECORD V 53DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 8	M 48	M 78
0.36	1	1.20	3.20	2.40
0.40	2	1.00	3.60	2.40
0.41	3	0.90	3.60	2.40
0.36	4	1.10	3.20	2.40
0.36	5	1.70	3.60	2.60
0.41	6	3.30	5.00	2.90
0.41	7	4.30	5.60	3.20
0.42	8	4.70	6.00	3.40
0.44	9	5.00	6.60	3.70
0.42	10	5.30	6.60	3.80
0.39	11	5.40	6.20	3.70
0.38	12	5.40	6.00	3.50
0.41	13	5.10	6.20	3.50
0.47	14	5.10	6.80	3.50
0.45	15	4.90	6.40	3.40
0.46	16	5.20	5.60	2.00
0.35	17	5.40	5.20	2.90
0.33	18	5.40	4.90	2.80
0.34	19	5.00	4.80	2.80
0.35	20	4.70	4.80	2.80
0.32	21	4.30	4.30	2.80
0.37	22	3.70	4.40	2.50
0.43	23	2.40	4.40	2.40
0.42	24	1.50	4.00	2.40

REGRESSION EQUATION. V 53= 0.27896+M 8(-0.03764)+M 48(0.09336)+M 78(-0.07248)

SYNTHETIC RECORD V 61DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 7	M 48	M 94
0.89	1	2.20	3.20	11.00
0.89	2	2.10	3.60	10.50
0.89	3	2.10	3.60	10.00
0.87	4	2.00	3.20	10.00
0.91	5	2.40	3.60	11.00
1.03	6	3.40	5.00	14.00
1.12	7	4.20	5.60	17.00
1.21	8	5.30	6.00	18.50
1.24	9	5.40	6.60	20.00
1.27	10	5.60	6.60	22.00
1.27	11	5.80	6.20	22.50
1.27	12	5.80	6.00	23.00
1.25	13	5.50	6.20	22.00
1.27	14	5.50	6.80	22.00
1.24	15	5.30	6.40	22.00
1.21	16	5.20	5.60	21.50
1.21	17	5.30	5.20	21.50
1.21	18	5.50	4.90	20.50
1.23	19	6.00	4.80	20.00
1.24	20	6.30	4.80	19.50
1.22	21	6.20	4.30	18.50
1.17	22	5.60	4.40	17.00
1.09	23	4.60	4.40	14.50
1.03	24	4.00	4.00	13.00

REGRESSION EQUATION. V 61= 0.59300+M 7(0.05872)+M 48(0.02475)+M 94(0.00825)

SYNTHETIC RECORD V 66DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 8	M 48	M 78
0.67	1	1.20	3.20	2.40
0.67	2	1.00	3.60	2.40
0.67	3	0.90	3.60	2.40
0.67	4	1.10	3.20	2.40
0.72	5	1.70	3.60	2.60
0.81	6	3.30	5.00	2.90
0.88	7	4.30	5.60	3.20
0.93	8	4.70	6.00	3.40
0.99	9	5.00	6.60	3.70
1.01	10	5.30	6.60	3.80
0.99	11	5.40	6.20	3.70
0.96	12	5.40	6.00	3.50
0.95	13	5.10	6.20	3.50
0.96	14	5.10	6.80	3.50
0.93	15	4.90	6.40	3.40
0.70	16	5.20	5.60	2.00
0.85	17	5.40	5.20	2.90
0.83	18	5.40	4.90	2.80
0.82	19	5.00	4.80	2.80
0.82	20	4.70	4.80	2.80
0.81	21	4.30	4.30	2.80
0.75	22	3.70	4.40	2.50
0.71	23	2.40	4.40	2.40
0.69	24	1.50	4.00	2.40

REGRESSION EQUATION. V 66= 0.23114+M 8(0.01770)+M 48(0.01025)+M 78(0.16210)

SYNTHETIC RECORD V 72DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 5	M 6	M 94
5.25	1	14.00	4.50	11.00
4.85	2	13.00	4.30	10.50
4.59	3	13.00	4.20	10.00
4.60	4	13.00	4.30	10.00
5.13	5	13.00	4.50	11.00
7.11	6	16.00	5.40	14.00
9.19	7	20.00	6.00	17.00
10.09	8	21.00	6.20	18.50
11.12	9	23.00	6.50	20.00
12.26	10	24.00	6.50	22.00
12.57	11	24.50	6.50	22.50
12.77	12	24.00	6.50	23.00
12.26	13	24.00	6.50	22.00
12.26	14	24.00	6.50	22.00
12.26	15	24.00	6.50	22.00
12.00	16	24.00	6.50	21.50
11.81	17	22.50	6.40	21.50
11.26	18	22.00	6.50	20.50
10.92	19	21.50	6.30	20.00
10.52	20	20.50	6.10	19.50
9.79	21	19.00	5.70	18.50
8.83	22	17.50	5.50	17.00
7.32	23	16.00	5.00	14.50
6.35	24	14.50	4.70	13.00

REGRESSION EQUATION. V 72= -2.52036+M 5(0.12074)+M 6(0.11251)+M 94(0.50680)

SYNTHETIC RECORD V 73DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 5	M 6	M 94
1.92	1	14.00	4.50	11.00
1.73	2	13.00	4.30	10.50
1.81	3	13.00	4.20	10.00
1.73	4	13.00	4.30	10.00
1.58	5	13.00	4.50	11.00
1.92	6	16.00	5.40	14.00
2.84	7	20.00	6.00	17.00
3.03	8	21.00	6.20	18.50
3.48	9	23.00	6.50	20.00
3.83	10	24.00	6.50	22.00
4.00	11	24.50	6.50	22.50
3.83	12	24.00	6.50	23.00
3.83	13	24.00	6.50	22.00
3.83	14	24.00	6.50	22.00
3.83	15	24.00	6.50	22.00
3.83	16	24.00	6.50	21.50
3.39	17	22.50	6.40	21.50
3.14	18	22.00	6.50	20.50
3.12	19	21.50	6.30	20.00
2.93	20	20.50	6.10	19.50
2.72	21	19.00	5.70	18.50
2.36	22	17.50	5.50	17.00
2.23	23	16.00	5.00	14.50
1.94	24	14.50	4.70	13.00

REGRESSION EQUATION. V 73= 0.54273+M 5(0.34166)+M 6(-0.75740)+M 94(0.00026)

SYNTHETIC RECORD V 74DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 5	M 6	M 94
6.13	1	14.00	4.50	11.00
5.68	2	13.00	4.30	10.50
5.68	3	13.00	4.20	10.00
5.61	4	13.00	4.30	10.00
5.61	5	13.00	4.50	11.00
6.96	6	16.00	5.40	14.00
9.05	7	20.00	6.00	17.00
9.65	8	21.00	6.20	18.50
10.70	9	23.00	6.50	20.00
11.52	10	24.00	6.50	22.00
11.86	11	24.50	6.50	22.50
11.67	12	24.00	6.50	23.00
11.52	13	24.00	6.50	22.00
11.52	14	24.00	6.50	22.00
11.52	15	24.00	6.50	22.00
11.45	16	24.00	6.50	21.50
10.74	17	22.50	6.40	21.50
10.25	18	22.00	6.50	20.50
10.06	19	21.50	6.30	20.00
9.62	20	20.50	6.10	19.50
8.98	21	19.00	5.70	18.50
8.12	22	17.50	5.50	17.00
7.33	23	16.00	5.00	14.50
6.54	24	14.50	4.70	13.00

REGRESSION EQUATION. V 74= 0.50978+M 5(0.52312)+M 6(-0.74693)+M 94(0.15066)

SYNTHETIC RECORD V 75DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 5	M 6	M 94
0.24	1	14.00	4.50	11.00
0.16	2	13.00	4.30	10.50
0.27	3	13.00	4.20	10.00
-0.01	4	13.00	4.30	10.00
-0.23	5	13.00	4.50	11.00
-0.30	6	16.00	5.40	14.00
0.94	7	20.00	6.00	17.00
1.37	8	21.00	6.20	18.50
1.99	9	23.00	6.50	20.00
3.14	10	24.00	6.50	22.00
3.54	11	24.50	6.50	22.50
3.47	12	24.00	6.50	23.00
3.14	13	24.00	6.50	22.00
3.14	14	24.00	6.50	22.00
3.14	15	24.00	6.50	22.00
2.97	16	24.00	6.50	21.50
2.53	17	22.50	6.40	21.50
1.68	18	22.00	6.50	20.50
1.83	19	21.50	6.30	20.00
1.74	20	20.50	6.10	19.50
1.81	21	19.00	5.70	18.50
1.14	22	17.50	5.50	17.00
0.98	23	16.00	5.00	14.50
0.60	24	14.50	4.70	13.00

REGRESSION EQUATION. V 75= 2.41311+M 5(0.47614)+M 6(-2.78771)+M 94(0.33714)

SYNTHETIC RECORD V 77DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 5	M 6	M 94
0.38	1	14.00	4.50	11.00
0.31	2	13.00	4.30	10.50
0.29	3	13.00	4.20	10.00
0.31	4	13.00	4.30	10.00
0.37	5	13.00	4.50	11.00
0.66	6	16.00	5.40	14.00
0.88	7	20.00	6.00	17.00
0.95	8	21.00	6.20	18.50
1.06	9	23.00	6.50	20.00
1.09	10	24.00	6.50	22.00
1.10	11	24.50	6.50	22.50
1.09	12	24.00	6.50	23.00
1.09	13	24.00	6.50	22.00
1.09	14	24.00	6.50	22.00
1.09	15	24.00	6.50	22.00
1.08	16	24.00	6.50	21.50
1.04	17	22.50	6.40	21.50
1.05	18	22.00	6.50	20.50
0.99	19	21.50	6.30	20.00
0.93	20	20.50	6.10	19.50
0.80	21	19.00	5.70	18.50
0.72	22	17.50	5.50	17.00
0.56	23	16.00	5.00	14.50
0.45	24	14.50	4.70	13.00

REGRESSION EQUATION. V 77= -1.02392+M 5(0.01155)+M 6(0.26186)+M 94(0.00598)

SYNTHETIC RECORD V 79DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 5	M 6	M 94
8.23	1	14.00	4.50	11.00
7.89	2	13.00	4.30	10.50
7.51	3	13.00	4.20	10.00
7.81	4	13.00	4.30	10.00
8.57	5	13.00	4.50	11.00
10.73	6	16.00	5.40	14.00
11.65	7	20.00	6.00	17.00
12.15	8	21.00	6.20	18.50
12.61	9	23.00	6.50	20.00
12.59	10	24.00	6.50	22.00
12.50	11	24.50	6.50	22.50
12.75	12	24.00	6.50	23.00
12.59	13	24.00	6.50	22.00
12.59	14	24.00	6.50	22.00
12.59	15	24.00	6.50	22.00
12.51	16	24.00	6.50	21.50
12.72	17	22.50	6.40	21.50
13.03	18	22.00	6.50	20.50
12.52	19	21.50	6.30	20.00
12.18	20	20.50	6.10	19.50
11.33	21	19.00	5.70	18.50
11.00	22	17.50	5.50	17.00
9.61	23	16.00	5.00	14.50
8.98	24	14.50	4.70	13.00

REGRESSION EQUATION. V 79= -2.27070+M 5(-0.33891)+M 6(2.99702)+M 94(0.15973)

SYNTHETIC RECORD V 80DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 5	M 6	M 94
1.57	1	14.00	4.50	11.00
1.58	2	13.00	4.30	10.50
1.56	3	13.00	4.20	10.00
1.52	4	13.00	4.30	10.00
1.56	5	13.00	4.50	11.00
1.58	6	16.00	5.40	14.00
1.74	7	20.00	6.00	17.00
1.86	8	21.00	6.20	18.50
1.94	9	23.00	6.50	20.00
2.20	10	24.00	6.50	22.00
2.27	11	24.50	6.50	22.50
2.33	12	24.00	6.50	23.00
2.20	13	24.00	6.50	22.00
2.20	14	24.00	6.50	22.00
2.20	15	24.00	6.50	22.00
2.14	16	24.00	6.50	21.50
2.17	17	22.50	6.40	21.50
1.99	18	22.00	6.50	20.50
2.01	19	21.50	6.30	20.00
2.02	20	20.50	6.10	19.50
2.05	21	19.00	5.70	18.50
1.93	22	17.50	5.50	17.00
1.82	23	16.00	5.00	14.50
1.74	24	14.50	4.70	13.00

REGRESSION EQUATION. V 80= 1.97593+M 5(0.01043)+M 6(-0.43330)+M 94(0.12697)

SYNTHETIC RECORD V 84DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 7	M 51	M 94
0.27	1	2.20	0.10	11.00
0.23	2	2.10	0.10	10.50
0.22	3	2.10	0.10	10.00
0.19	4	2.00	0.10	10.00
0.32	5	2.40	0.10	11.00
0.68	6	3.40	1.10	14.00
1.00	7	4.20	2.00	17.00
1.32	8	5.30	2.00	18.50
1.39	9	5.40	2.20	20.00
1.49	10	5.60	2.20	22.00
1.56	11	5.80	2.20	22.50
1.57	12	5.80	2.10	23.00
1.46	13	5.50	2.10	22.00
1.46	14	5.50	2.00	22.00
1.41	15	5.30	1.90	22.00
1.37	16	5.20	2.00	21.50
1.40	17	5.30	2.10	21.50
1.43	18	5.50	2.20	20.50
1.54	19	6.00	2.20	20.00
1.60	20	6.30	2.00	19.50
1.54	21	6.20	1.80	18.50
1.34	22	5.60	1.60	17.00
1.01	23	4.60	1.20	14.50
0.81	24	4.00	1.00	13.00

REGRESSION EQUATION. V 84= -0.58574+M 7(0.25612)+M 51(0.03204)+M 94(0.02605)

SYNTHETIC RECORD V 86DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 5	M 6	M 60
2.81	1	14.00	4.50	16.30
2.69	2	13.00	4.30	15.80
2.57	3	13.00	4.20	15.00
2.39	4	13.00	4.30	14.50
2.13	5	13.00	4.50	14.00
1.96	6	16.00	5.40	14.00
2.39	7	20.00	6.00	15.00
3.09	8	21.00	6.20	18.00
4.11	9	23.00	6.50	22.00
4.61	10	24.00	6.50	23.50
4.80	11	24.50	6.50	24.00
4.95	12	24.00	6.50	25.00
5.18	13	24.00	6.50	26.00
5.18	14	24.00	6.50	26.00
5.18	15	24.00	6.50	26.00
5.18	16	24.00	6.50	26.00
4.79	17	22.50	6.40	25.00
4.41	18	22.00	6.50	24.00
4.25	19	21.50	6.30	23.00
4.00	20	20.50	6.10	22.00
3.94	21	19.00	5.70	21.50
3.73	22	17.50	5.50	21.00
3.62	23	16.00	5.00	20.00
3.14	24	14.50	4.70	18.00

REGRESSION EQUATION. V 86= 0.08134+M 5(0.15618)+M 6(-0.70887)+M 60(0.22922)

SYNTHETIC RECORD V 88DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 5	M 6	M 76
2.99	1	14.00	4.50	3.40
2.74	2	13.00	4.30	3.30
2.71	3	13.00	4.20	3.20
2.69	4	13.00	4.30	3.20
2.79	5	13.00	4.50	3.50
3.71	6	16.00	5.40	4.30
4.90	7	20.00	6.00	5.00
5.37	8	21.00	6.20	5.60
5.94	9	23.00	6.50	5.90
6.41	10	24.00	6.50	6.40
6.53	11	24.50	6.50	6.40
6.41	12	24.00	6.50	6.40
6.41	13	24.00	6.50	6.40
6.41	14	24.00	6.50	6.40
6.28	15	24.00	6.50	6.10
6.15	16	24.00	6.50	5.80
5.70	17	22.50	6.40	5.60
5.51	18	22.00	6.50	5.50
5.21	19	21.50	6.30	5.00
4.91	20	20.50	6.10	4.80
4.53	21	19.00	5.70	4.60
4.15	22	17.50	5.50	4.50
3.79	23	16.00	5.00	4.30
3.30	24	14.50	4.70	3.90

REGRESSION EQUATION. V 88= -1.10462+M 5(0.24962)+M 6(-0.19680)+M 76(0.43762)

SYNTHETIC RECORD V 89DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 5	M 44	M 60
0.63	1	14.00	9.50	16.30
0.60	2	13.00	9.00	15.80
0.57	3	13.00	9.00	15.00
0.55	4	13.00	9.00	14.50
0.53	5	13.00	9.00	14.00
0.51	6	16.00	12.00	14.00
0.57	7	20.00	15.00	15.00
0.67	8	21.00	16.00	18.00
0.83	9	23.00	17.30	22.00
0.89	10	24.00	18.00	23.50
0.88	11	24.50	19.00	24.00
0.92	12	24.00	18.50	25.00
0.94	13	24.00	19.00	26.00
0.94	14	24.00	19.00	26.00
1.00	15	24.00	17.50	26.00
1.02	16	24.00	17.00	26.00
0.96	17	22.50	16.50	25.00
0.92	18	22.00	16.00	24.00
0.88	19	21.50	15.80	23.00
0.86	20	20.50	14.50	22.00
0.81	21	19.00	14.00	21.50
0.74	22	17.50	14.00	21.00
0.71	23	16.00	12.50	20.00
0.65	24	14.50	11.00	18.00

REGRESSION EQUATION. V 89= -0.05868+M 5(0.03647)+M 44(-0.04323)+M 60(0.03628)

SYNTHETIC RECORD V 90DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 5	M 6	M 76
1.52	1	14.00	4.50	3.40
1.51	2	13.00	4.30	3.30
1.48	3	13.00	4.20	3.20
1.50	4	13.00	4.30	3.20
1.55	5	13.00	4.50	3.50
1.69	6	16.00	5.40	4.30
1.75	7	20.00	6.00	5.00
1.82	8	21.00	6.20	5.60
1.84	9	23.00	6.50	5.90
1.87	10	24.00	6.50	6.40
1.85	11	24.50	6.50	6.40
1.87	12	24.00	6.50	6.40
1.87	13	24.00	6.50	6.40
1.87	14	24.00	6.50	6.40
1.84	15	24.00	6.50	6.10
1.81	16	24.00	6.50	5.80
1.81	17	22.50	6.40	5.60
1.83	18	22.00	6.50	5.50
1.76	19	21.50	6.30	5.00
1.73	20	20.50	6.10	4.80
1.69	21	19.00	5.70	4.60
1.69	22	17.50	5.50	4.50
1.63	23	16.00	5.00	4.30
1.59	24	14.50	4.70	3.90

REGRESSION EQUATION. V 90= 0.86860+M 5(-0.02456)+M 6(0.14542)+M 76(0.10036)

SYNTHETIC RECORD V 91DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 5	M 6	M 60
2.40	1	14.00	4.50	16.30
2.26	2	13.00	4.30	15.80
2.13	3	13.00	4.20	15.00
2.08	4	13.00	4.30	14.50
2.05	5	13.00	4.50	14.00
2.30	6	16.00	5.40	14.00
2.64	7	20.00	6.00	15.00
3.13	8	21.00	6.20	18.00
3.81	9	23.00	6.50	22.00
4.04	10	24.00	6.50	23.50
4.12	11	24.50	6.50	24.00
4.26	12	24.00	6.50	25.00
4.40	13	24.00	6.50	26.00
4.40	14	24.00	6.50	26.00
4.40	15	24.00	6.50	26.00
4.40	16	24.00	6.50	26.00
4.21	17	22.50	6.40	25.00
4.08	18	22.00	6.50	24.00
3.88	19	21.50	6.30	23.00
3.68	20	20.50	6.10	22.00
3.49	21	19.00	5.70	21.50
3.35	22	17.50	5.50	21.00
3.07	23	16.00	5.00	20.00
2.69	24	14.50	4.70	18.00

REGRESSION EQUATION. V 91= -1.15548+M 5(0.01908)+M 6(0.21241)+M 60(0.14293)

SYNTHETIC RECORD V 93DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 7	M 76	M 77
0.18	1	2.20	3.40	7.30
0.15	2	2.10	3.30	7.00
0.09	3	2.10	3.20	6.80
0.11	4	2.00	3.20	6.80
0.20	5	2.40	3.50	7.50
0.44	6	3.40	4.30	9.50
0.71	7	4.20	5.00	11.00
0.83	8	5.30	5.60	12.50
1.07	9	5.40	5.90	12.80
1.41	10	5.60	6.40	13.50
1.27	11	5.80	6.40	14.00
1.27	12	5.80	6.40	14.00
1.25	13	5.50	6.40	14.30
1.20	14	5.50	6.40	14.50
1.14	15	5.30	6.10	13.50
0.95	16	5.20	5.80	13.00
0.83	17	5.30	5.60	12.50
0.81	18	5.50	5.50	12.00
0.30	19	6.00	5.00	11.50
0.15	20	6.30	4.80	11.00
0.06	21	6.20	4.60	10.50
0.17	22	5.60	4.50	10.00
0.35	23	4.00	4.30	9.00
0.14	24	4.00	3.90	8.50

REGRESSION EQUATION. V 93= -1.44299+M 7(-0.16803)+M 76(1.06827)+M 77(-0.22526)

SYNTHETIC RECORD V 97DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 6	M 7	M 8
0.93	1	4.50	2.20	1.20
0.93	2	4.30	2.10	1.00
0.94	3	4.20	2.10	0.90
0.93	4	4.30	2.00	1.10
0.92	5	4.50	2.40	1.70
0.88	6	5.40	3.40	3.30
0.85	7	6.00	4.20	4.30
0.86	8	6.20	5.30	4.70
0.84	9	6.50	5.40	5.00
0.84	10	6.50	5.60	5.30
0.84	11	6.50	5.80	5.40
0.84	12	6.50	5.80	5.40
0.84	13	6.50	5.50	5.10
0.84	14	6.50	5.50	5.10
0.84	15	6.50	5.30	4.90
0.84	16	6.50	5.20	5.20
0.84	17	6.40	5.30	5.40
0.84	18	6.50	5.50	5.40
0.86	19	6.30	6.00	5.00
0.88	20	6.10	6.30	4.70
0.90	21	5.70	6.20	4.30
0.91	22	5.50	5.60	3.70
0.93	23	5.00	4.60	2.40
0.95	24	4.70	4.00	1.50

REGRESSION EQUATION. V 97= 1.04884+M 6(-0.03151)+M 7(0.02024)+M 8(-0.02177)

SYNTHETIC RECORD V 98DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 7	M 94	M147
0.70	1	2.20	11.00	0.40
0.69	2	2.10	10.50	0.40
0.67	3	2.10	10.00	0.40
0.70	4	2.00	10.00	0.60
0.80	5	2.40	11.00	1.60
0.88	6	3.40	14.00	2.20
0.94	7	4.20	17.00	2.40
0.93	8	5.30	18.50	2.80
1.03	9	5.40	20.00	3.30
1.08	10	5.60	22.00	3.20
1.07	11	5.80	22.50	3.00
1.07	12	5.80	23.00	2.80
1.08	13	5.50	22.00	3.10
1.07	14	5.50	22.00	3.00
1.11	15	5.30	22.00	3.20
1.12	16	5.20	21.50	3.40
1.15	17	5.30	21.50	3.80
1.14	18	5.50	20.50	4.30
1.05	19	6.00	20.00	4.00
0.90	20	6.30	19.50	3.00
0.61	21	6.20	18.50	0.40
0.61	22	5.60	17.00	0.40
0.61	23	4.60	14.50	0.40
0.60	24	4.00	13.00	0.40

REGRESSION EQUATION. V 98= 0.43202+M 7(-0.09620)+M 94(0.03982)+M147(0.09849)

SYNTHETIC RECORD V101DAY 174

DISCHARGE(MGD)	HOUR(FROM 1AM, DAY174)	M 7	M 8	M 94
0.48	1	2.20	1.20	11.00
0.43	2	2.10	1.00	10.50
0.40	3	2.10	0.90	10.00
0.39	4	2.00	1.10	10.00
0.52	5	2.40	1.70	11.00
0.87	6	3.40	3.30	14.00
1.18	7	4.20	4.30	17.00
1.42	8	5.30	4.70	18.50
1.53	9	5.40	5.00	20.00
1.69	10	5.60	5.30	22.00
1.75	11	5.80	5.40	22.50
1.78	12	5.80	5.40	23.00
1.68	13	5.50	5.10	22.00
1.68	14	5.50	5.10	22.00
1.65	15	5.30	4.90	22.00
1.61	16	5.20	5.20	21.50
1.63	17	5.30	5.40	21.50
1.59	18	5.50	5.40	20.50
1.60	19	6.00	5.00	20.00
1.60	20	6.30	4.70	19.50
1.51	21	6.20	4.30	18.50
1.33	22	5.60	3.70	17.00
1.02	23	4.60	2.40	14.50
0.83	24	4.00	1.50	13.00

REGRESSION EQUATION. V101= -0.51562+M 7(0.11788)+M 8(0.02619)+M 94(0.06411)

Boston Water

APPENDIX WSU5

PIPE FRICTION COEFFICIENTS FROM PITOMETER GAUGING POINT DATA

ABSTRACT: Computer programs are presented to aid in the computation of friction coefficients from field data. The method was successfully used to supplement loss of head tests.

PIPE FRICTION COEFFICIENTS FROM MEASURED VELOCITY PROFILES

by Charles D.D. Howard

I. INTRODUCTION

The computer programs described herein were used to compute pipe friction coefficients from pitot tube traverses of water mains in the City of Boston. Three computer programs were utilized in the computations. INTEG uses pitot tube raw data to compute the velocity distribution, the average velocity in the pipe, the total discharge in the pipe, and the average velocities in the top and bottom halves of the pipe. This information is then used to compute the wall shear stress in the top and bottom halves of the pipe by a graphical method. HAZENC uses the average velocity and shear stress obtained for the top and bottom halves of the pipe to compute respective Hazen-Williams coefficients. The final program in the series, EQUIVC operates on the previously determined overall average velocity and the average velocity and Hazen-Williams coefficients for the top and bottom halves of the pipe. The output from EQUIVC is the equivalent Hazen-Williams coefficient, the object of the overall analysis.

A comprehensive explanation and evaluation of this technique is presented in the Appendix.

II. INTEG

The computer program, INTEG, computes the velocity distribution in a circular pipe flowing full. This distribution is integrated over the pipe area to determine the average velocity and discharge. The input data to the program consists of a table of piezometric heads as a function of position, obtained from a pitot tube traverse taken vertically across the pipe. The piezometric head, H (I) must be given in inches of manometer fluid of specific gravity,SG.

The program is written in CARD FORTRAN II (a General Electric Company computer language). Modification of input and output statements would make the program suitable for use on other computers. Input data is read in free format in this language.

Use of the Program

The input data is arranged in the following order:

1. The first card contains the number of the run, NOT.
2. The second card contains the number of the gauging station, IGAGE, the diameter of the pipe in inches, DIA, the specific gravity of the manometer fluid, SG, and the number of data points on the velocity traverse,N.

3. Each of the following N cards has two numbers punched on it: P (I), the distance between the top of the pipe and the points on the velocity traverse; H (I), the piezometric head in inches of manometer fluid.

The data must be arranged so that the first and last points are near the top and bottom of the pipes respectively. The program also requires that a data point be supplied at the pipe center line. In some cases it may be necessary to extrapolate measured data in order to obtain the required centerline reading.

Output

The output consists of the gauge number, the pipe diameter in inches, the velocity profile (note that Y/D = 0 at the pipe top and 1 at the pipe bottom), the average velocity in the pipe, the average velocities in the top and bottom halves of the pipe, and the discharge in million gallons per day.

III. WALL SHEAR STRESS DETERMINATION

The universal logarithmic velocity distribution law may be stated in terms of a velocity defect as:

$$\frac{\overline{U} - u}{U_*} = \frac{2.3}{K} \log_{10} \frac{Y}{D/2} \qquad (1)$$

in which $\overline{U}$ is the average velocity, U_* is the shear velocity, u is the velocity at a distance Y from the wall, and K is Von Karman's universal constant.

This equation may be expanded to yield:

$$u = \left(\frac{-2.3U_*}{K}\right) \log_{10} \frac{Y}{D/2} + \overline{U} \qquad (2)$$

Equation 2 represents a straight line on semi-logarithmic graph paper. The intercept of the line is $\overline{U}$ and the slope, $\alpha = \frac{-2.3U_*}{K}$

The shear velocity U_* is given by:

$$U_* = \sqrt{\tau_0 / \rho} \qquad (3)$$

in which τ_0 is the wall shear stress and ρ the fluid density.

Equation may be rewritten as:

$$\tau_0 = \rho U_*$$

It follows that the wall shear stress τ_0 can be computed from Equation

The slope, α is the change in velocity over one logarithmic cycle of Y/D. The following example will illustrate the procedure.

Example

Since we are interested only in the slope of the velocity profile on semi-logarithmic graph paper, we can plot the velocity against $\log_{10}Y$ or $\log_{10}Y/D$ or $\log_{10}\frac{Y}{D/2}$ and the resulting slope, α will always be the same.

Figure 1 shows a typical velocity profile of u vs. $\log_{10}Y/D$. Notice that the velocity profile is not symmetrical about the center line (separate curves are given for the top and bottom halves of the pipe). We will therefore have two values of wall shear stress. For the top half of the pipe, the velocity change over one log cycle is 1.5, while for the bottom half of the pipe, it is 1.22. The corresponding wall shear stresses are 0.132 pounds per square foot and 0.0874 psf. This information may now be used as input data for the next computer program in the series.

IV. COMPUTING THE HAZEN-WILLIAMS COEFFICIENT - HAZENC

HAZENC is used to compute the Hazen-Williams coefficient from:

$$C = \frac{\frac{VEL}{1.318}}{\left(\frac{TAO}{62.4}\right)^{0.54}\left(\frac{DIA}{48.0}\right)^{0.90}} \qquad (5)$$

in which VEL is the mean velocity in the pipe in feet per second and TAO is the wall shear stress in pounds per square foot. TAO was determined by the procedures outlined in Section III. DIA is the pipe diameter in inches.

Using the Program

The input data consists of a single card, containing the average velocity, the wall shear stress, the pipe diameter, and the gauging point number. The output consists of the Hazen-Williams coefficient. Note that if two coefficients are desired, one for the top and one for the bottom of the pipe, two computer runs must be made.

V. THE OVERALL COEFFICIENT - EQUIVC

If the measured velocity profile is not symmetrical about the pipe centerline, it is desirable to compute an overall coefficient based on the coefficients obtained independently for the top and bottom halves of the pipe. EQUIVC is designed to perform the simple computations required. The equation programmed is:

$$C_e = 1.46 \frac{\overline{U}}{\left[\left(\frac{U_t}{C_t}\right)^{1.85} + \left(\frac{U_b}{C_b}\right)^{1.85}\right]^{0.54}} \qquad (6)$$

in which $\overline{U}$ is the overall average velocity in the pipe. C_t and C_b are the previously computed Hazen-Williams coefficients for the top and bottom halves of the pipes respectively.

Use of the Program

The program accepts the following items as input data on a single card: the Hazen-Williams coefficients for the top and bottom halves of the pipe, the average velocity over the whole pipe, the pipe diameter in inches, and the gauging point identification number. All velocities are in feet per second. The program output consists of an echo print of pertinent input data together with the overall Hazen-Williams coefficient.

Reprinted from and copyrighted as a part of
Journal American Water Works Association
Vol. 59, No. 5, May, 1967
Printed in U. S. A.

Pipe Friction Coefficients From Measured Velocity Profiles

Charles D. D. Howard

A contribution by Charles D. D. Howard, Hydraulic Engineer & Head Computer Applications, Charles A. Maquire & Associates, Boston.

THE Boston trunk water main system consists of approximately 150 mi of pipe, most of which is constructed of cast iron, varying in diameter between 16 and 48 in. Some of these mains were installed more than one hundred years ago. The Hazen-Williams coefficients for these pipes varies from approximately 50–130. The normal hourly demand variation results in a considerable range of discharge and pressure over a daily cycle. The resulting range of Reynolds' number in the trunk main system is between approximately 10,000 and 1.5×10^6. As most trunk mains are somewhat tuberculated, this range corresponds to either fully rough turbulent or transition turbulent flow (according to the classifications shown on the Moody diagram).

Scope of Problem

Approximately 50 flow gaugings were made on the trunk main system and at each gauging point a velocity profile, theoretically suitable for determination of the friction coefficient, was obtained. Because of economic and practical considerations only ten or twelve satisfactory loss of head tests were conducted. Estimates of friction coefficients based solely on pipe age were found to be unreliable. It was therefore deemed advisable to find some way to estimate the friction coefficient while making maximum use of available field data. Estimates based on the shape of the velocity profile were often found to be compatible with coefficients obtained from loss of head tests. The velocity profile method was therefore considered a useful tool if properly considered along with information on pipe age, material of construction, in situ conditions, hydraulic behavior, flow conditions, and the nature and scatter of the data itself. As the nature of the data is best determined by a physically meaningful graphic presentation, the present semi-graphic method was chosen for practical use. The method is based on a similar technique often used in studies of sediment transport in open-channels.

The work described in this paper was initiated as part of a comprehensive study of the entire water distribution system, to define a program of planned improvements over the coming decades. This study is consistent with Boston's present revitalization through Urban renewal.

Field Testing Program

A program of field discharge and pressure measurements was initiated

in the summer of 1966. This program was intended to supply basic water system data to complement land use studies and meter records. The field discharge readings, velocity traverses, and loss of head tests to determine friction coefficients were performed by Pitometer Associates of New York using standard procedures.[2]

Cole pitometers, Fig. 1, were used to obtain velocity profiles and 24-hr centerline velocity records. This type of instrument has been used extensively in water distribution studies.[1-5] These instruments are rugged and convenient to use in the field, although they have a rather low coefficient which is strongly dependent upon velocity. Just as with most impact tubes, they are not well suited to the measurements of velocities less than approximately 0.5 ft/sec.

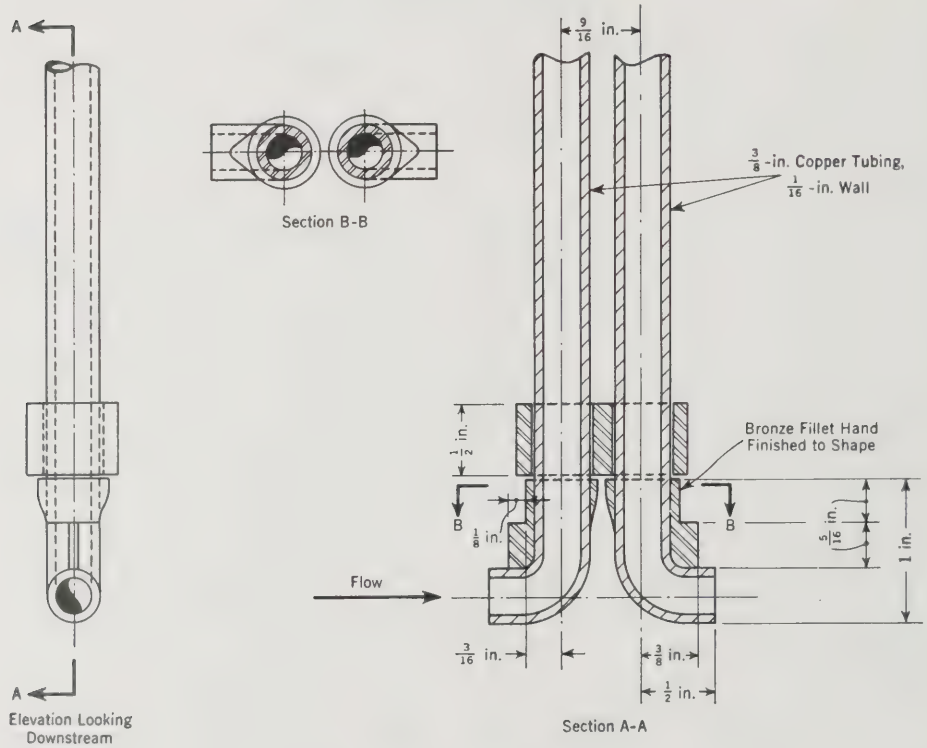


Fig. 1. Details of the Cole Pitometer

Cole pitometers are used in water distribution studies to obtain velocity profiles and 24-hr centerline velocity records.

Typical velocity traverses obtained from Boston mains are shown in Fig. 2. It can be seen that the profiles are not symmetrical about the centerline. This behavior occurs if there is an upstream disturbance or if

one side of the pipe is rougher than the other. In the latter case it indicates either preferential corrosion and tuberculation, or sediment deposits on the bottom of the pipe. For example, Fig. 3 shows a similar nonsymmetrical velocity distribution that was obtained from laboratory studies of air flow in a 10-in. pipe which had one half of its circumference uniformly roughened artificially with $\frac{1}{8}$-in. diameter plastic spheres. Figs. 2 & 3 are strikingly similar. Figure 2 indicates a higher boundary resistance on the lower half-circumference; the converse behavior is shown in Fig. 3.

Use of Velocity Profiles

The constants in the velocity distribution equation of Prandtl-von Kármán, often referred to as the "universal velocity distribution," were originally determined from pressure drop tests on horizontal circular pipes. Consequently, if the velocity profile is known, the equation can readily be used to estimate pressure drop, and hence the friction factor.

The Prandtl-von Kármán equation can be written as:

$$\frac{V_{max} - V}{V_*} = \frac{-2.3}{K} \log_{10} 2y/D \qquad (1)$$

in which V is the velocity at a distance y from the wall of a pipe having a diameter D. K is von Kármán's constant which has been experimentally determined as equal to 0.4. The shear velocity, V_* can be expressed as:

$$V_* = \sqrt{\tau_0/\rho} \qquad (2)$$

in which ρ is the fluid mass density and τ_0 is the wall shear stress. For a circular pipe:

$$\tau_0 = \rho g \frac{DH}{4} \qquad (3)$$

in which g is the acceleration of gravity and H is the energy loss per unit length of pipe. (For a horizontal pipe H appears as a loss of pressure along the pipe.)

From (3)

$$H = \frac{4\tau_0}{\rho g D} \qquad (4)$$

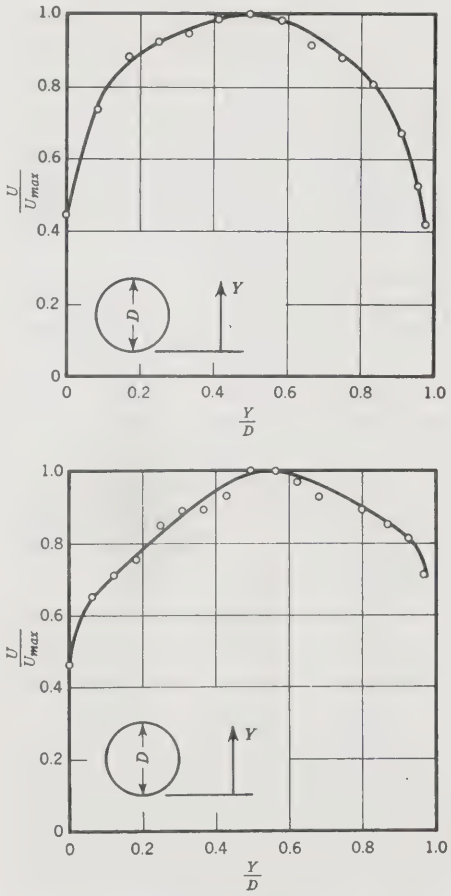


Fig. 2. Dimensionless Velocity Profiles

The profiles are not symmetrical about the centerline. This behavior occurs if there is an upstream disturbance or if one side of the pipe is rougher than the other.

The Hazen-Williams coefficient, C appears in the empirical equation:

$$V = 1.318\, CR^{0.63}H^{0.54} \qquad (5)$$

in which V is the average velocity and R is given by:

$$R = D/4 \qquad (6)$$

From (3), (4), (5) and (6) one obtains the following:

$$C = \frac{V}{1.318}\left(\frac{\rho g}{\tau_0}\right)^{0.54}\left(\frac{4}{D}\right)^{0.09} \qquad (7)$$

A practical way to determine τ_0 is to plot the velocity profile on semi-logarithmic paper as shown in Fig. 4, noting that the data near the top and bottom of the pipe are treated separately. Assuming that the velocity distribution follows the form of (1), fit a straight line through the data. As (1) does not hold near the pipe center or wall, added weight must be given to those points in the middle third annular region. For the present study, the curves were fitted by eye. They could, however, be fitted analytically.

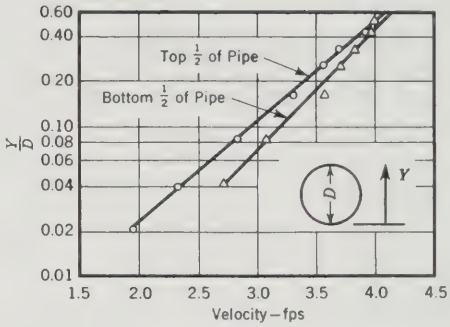


Fig. 4. Semi-Logarithmic Velocity Profile

As the Prandtl-von Kármán equation does not hold near the pipe center or wall, added weight must be given to those points in the middle third annular region.

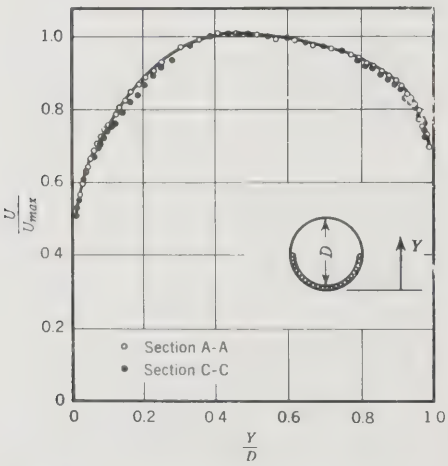


Fig. 3. Dimensionless Velocity Profile

This distribution was obtained from laboratory studies of air-flow in a 10-in. pipe with one-half of the circumference artificially roughened with ⅛-in. diameter plastic spheres. Section C-C is 15-in. U/S from A-A.

From equation (1) it follows that the velocity change over one log cycle of y/D defines $\left(\frac{2.3V_*}{K}\right)$. From equation (2) one can then obtain τ_0 and thereby determine C using equation 7. An example of the use of the method is shown in Fig. 4 in which the Δ vel = 1.50 for the top half of the pipe and 1.22 for the bottom, while $\tau_0 = 0.132$ for the top and 0.0874 for the bottom.

In those cases for which the friction coefficient determined for the upper half of the pipe is substantially different for the coefficient obtained for the lower half, the following method may be used to compute an equivalent or overall coefficient.

$$H = H_T + H_B$$

in which H_T and H_B are the energy

losses caused by boundary resistance on the top and bottom halves of the pipe. From (5) the equivalent coefficient C_e, is given by:

$$C_e = 1.46V/\left[\left(\frac{V_T}{C_T}\right)^{1.85} + \left(\frac{V_B}{C_B}\right)^{1.85}\right]^{0.54}$$

in which T and B refer to the top and bottom halves of the pipe.

Conclusions—Application

The friction coefficient obtained from the shape of the velocity profile depends on the similarity between field and laboratory conditions. If the field gauging point is properly located, the velocity profile represents the profile of a fully developed turbulent boundary layer and the von Kármán constant, $K = 0.4$, is applicable. In such a case the friction coefficient so obtained will accurately indicate conditions at the pipe wall at the gauging point. On the other hand, the loss of head test lumps together variations in wall roughness along the pipe, the effect of pipe bends, valves, and fittings, the distribution of flow takeoffs along a reach, and averaging of input and output discharge over the test reach into a single coefficient. When comparing the two methods for obtaining friction-coefficient, it is necessary to consider each test in detail to determine if the frictional effects are comparable. When this is done, agreement in evaluating individual tests can result. The engineer is then in a position to apply the knowledge gained from velocity profiles to estimates of friction coefficients where loss of head data are unavailable. In the case of the Boston water study the velocity profile data were extremely valuable for this purpose.

Acknowledgments

The work described in this paper was performed as part of HUD project No. P-Mass.-3307. Data was furnished by agencies of the US Government, the Commonwealth of Massachusetts, and the City of Boston.

Edward J. Pinkul, Division Engineer of the Boston Water Division, has made many practical suggestions throughout this study. The field study was made by Robert Vitali, Field Engineer, under the general supervision of Charles Knoener, Eastern District Manager of Pitometer Associates.

At Charles A. Maguire & Associates, the author has had invaluable suggestions from K. P. Devenis, Associate; and Robert Barrows, David Moran and Douglas Haith, Hydraulic Engineers. Mrs. Jane Fenner dutifully typed the manuscript.

References

1. Pitot, H. Description d'une machine pour mesurer la vitesse des eaux et le sillage des vasseau. *Memoirs de l'Acadamie Royal des Sciences* (Nov. 1732).
2. Cole, E. Shaw. Present-Day Scope of Pitometer Surveys. *Jour. AWWA,* 37:2:181 (Feb. 1945).
3. Cole, Edward S. Pitot-Tube Practice. *Trans. ASME,* HYD-57-8 (pp. 281–293) (1935).
4. Hubbard, C. W. Investigation of Error of Pitot Tubes. *Trans. ASME* (pp. 447–506) (Aug. 1939).
5. Cole, Edward S. & Cole, E. Shaw. Pitot Tubes in Large Pipes. *Trans. ASME* (pp. 465–475) (Aug. 1939).

```
00000 C234567
00010 C       INTEG    THIS PROGRAM COMPUTES POINT VELOCITIES AND AVERAGE
00011 C       VELOCITIES IN THE TOP AND BOTTOM HALVES OF THE PIPE USING
00012 C       DATA SUPPLIED FROM TRAVERSE TAKEN BY PITOTMETER ASSOC.
00013 C        A CONSTANT PITOT COEF OF 0.87 IS ASSUMED.
00014 C       A DATA POINT ON THE PIPE CENTRELINE MUST BE SUPPLIED. ALL
00015 C       INPUT DATA IS IN INCHES.
00020        DIMENSION R(30),DR(30),V(30),DQ(30),P(30),H(30),YD(30)
00022         DIMENSION RA(30)
00030        FORMAT IN(08H01SYSTAP)
00040        CALL OPEN(IN)
00050        IF(END FILE)500
00060    200 READ INPUT TAPE 1,:NOT
00070        READ INPUT TAPE 1,: IGAGE,DIA,SG,N
00080        N1=N+1
00082        DO 300 I=2,N1
00090    300 READ INPUT TAPE 1,:P(I),H(I)
00100        N2=N+2
00120        P(1)=0.0
00130        H(1)=0.0
00160        H(N2)=0.0
00170        P(N2)=DIA
00190        DO 40 I=1,N2
00200         SKRT=H(I)*(SG-1.0)*64.4/12.0
00210        V(I)=SQRTF(SKRT)
00212         V(I)=0.87*V(I)
00220        YD(I)=P(I)/DIA
00230        R(I)=((DIA/2.0)-P(I))/12.0
00240        CHECK=R(I)
00250        IF(CHECK)11,10,11
00260     10 L=I-1
00270    11  RR=R(I)
00280    40  R(I)=ABSF(RR)
00290         DO 50 I=1,N1
00294         II=I+1
00300   50    RA(I)=(R(II)+R(I))/2.0
00310         Q=0.0
00320         DO 60 I=1,N1
00322         II=I+1
00330         DR(I)=R(II)-R(I)
00340        DEL=DR(I)
00350        DR(I)=ABSF(DEL)
00352         VEL=(V(I)+V(II))/2.0
00360         DQ(I)=VEL*RA(I)*DR(I)*6.2832
00362         DQ(I)=DQ(I)/2.0
00370    60  Q=Q+DQ(I)
00372        DIA=DIA/12.0
00380        VAVE=Q*4.0/(3.1416*(DIA**2))
00390        TOPQ=0.0
004400        DO 12 I=1,L
```

```
00410     12 TOPQ=TOPQ+DQ(I)
00420        TOPV=TOPQ*8.0/(3.1416*(DIA**2))
00430        BOTV=(Q-TOPQ)*8.0/(3.1416*(DIA**2))
00440         PRINT 100,IGAGE
00441         DIA=12.0*DIA
00442          PRINT 800, DIA
00444  800      FORMAT("DIAMETER(INCHES)=",F6.1)
00445         DIA=DIA/12.0
00450    100 FORMAT(///"PITOTMETER GAGING POINT NO.",I4)
00460        PRINT 110
00470    110 FORMAT(2X,"Y/D",7X,"VEL(FPS)")
00480        DO 120 I=1,N2
00490    120  PRINT 130,YD(I),V(I)
00500    130 FORMAT(F8.4,3X,F8.4)
00510        PRINT 140,VAVE
00520    140 FORMAT("OVERALL AVE. VEL.=",F8.4)
00530         PRINT 150,BOTV,TOPV
00540  150    FORMAT("TOP AVE. VEL.=",F7.4,3X,"BOT AVE VEL.=",F7.4)
00542          Q=0.646317*Q
00550        PRINT 160,Q
00560  160     FORMAT("AVE DISCHARGE(MGD)=",F7.3)
00570        GO TO 200
00580    500 STOP
00590         END
```

```
00000 C
00010 C      HAZENC * COMPUTE HAZEN C FROM VELOCITY PROFILE
00020        FORMAT INPUT(08H01SYSTAP)
00021        CALL OPEN(INPUT)
00030   1004  FORMAT("HAZEN C=",F6.1/////)
00040    100 READ INPUT TAPE 1,:VEL,TAO,DIA,IGAGE
00050         PRINT 300,IGAGE
00060   300   FORMAT("PITOTMETER GAGING POINT NO.",I4)
00070        DIA=DIA/12.0
00080        A=VEL/1.318
00090        B=(TAO/62.4)**0.54
00100         D=(DIA/4.0)**0.09
00110        C=A/(B*D)
00120        PRINT 1004,C
00130        GO TO 100
00140        END
```

```
00000 C      COMPUTES EQUIVALENT HAZEN C COEF FROM TOP AND BOT VALS
00010 C      EQUIVC
00020         FORMAT INPUT(08H01SYSTAP)
```

```
      CALL OPEN(INPUT)
    1 READ INPUT TOPE 1,: CT,VT,CB,VB,V,D,IGAGE
      BA=(VT/CT)**1.65
      BB=(VB/CB)**1.65
      BC=(BA+BB)**0.54
      CE=1.465*V/BC
      PRINT 100,IGAGE
  100 FORMAT ("GAGING POINT",I4)
      PRINT 101,CE
      PRINT 200,CT,CB
      PRINT 201,VT,VB
  201 FORMAT("TOP VEL=",F6.3,"BOTTOM VEL=",F6.3///)
  200 FORMAT("TOP C=",F6.1,"BOTTOM C=",F6.1)
  101 FORMAT("EQUIV. C=",F6.1)
      GO TO 1
      END
```

Boston Water

APPENDIX WSU6

PROCEDURES FOR EVALUATING WATER CONSUMPTION PATTERNS FROM FIELD DATA

ABSTRACT: Field gaugings of trunk main discharges had two limitations: firstly, the gaugings were not all made at the same time; secondly, not all pipes were gauged. Several computer programs were utilized in the evaluation of these data and the development of consumption patterns.

PROCEDURES FOR EVALUATING WATER CONSUMPTION PATTERNS FROM FIELD DATA

by Charles D.D. Howard and Douglas A. Haith

In order to determine the most critical hour of the day at local points in the Boston water distribution systems, it was necessary to obtain 24-hour consumption demand curves throughout the network. An efficient network metering system for determining the local consumption pattern would involve isolation of small areas containing several nodes, and measurement of the discharge of pipes leading to the area. In this way, a demand curve for each small area would be obtained. If the curve was made dimensionless with respect to the 24-hour average flow, its shape could logically be assigned to the individual nodes in the area. If the number of nodes in the area is small, the node demand curves would be reasonably approximated. The above essentially describes the procedure followed during the Boston Water Study.

In order to derive the actual magnitudes of the hourly demand, it was necessary to obtain a daily average demand at each node. Using land-use maps, population densities and aerial photographs, good estimates of these averages were readily derived. These values were then scaled by a constant so that the total average demand for the study day was equal to the average hourly input to the network as measured at the MDC meters. With these new averages and the dimensionless demand curves, the 24-hour demand at each node was obtained by multiplying its average demand by the appropriate curve.

Unfortunately, the conceptual simplicity of the above procedure is in sharp contrast to the practical difficulties encountered in its use. In particular, the actual demand curves were quite elusive. Several sources of inaccuracy were present. First, it was virtually impossible to isolate all inputs into an area. To be sure, all the larger mains were metered. However, the amount of flow in unmetered twelve and sixteen inch pipes was sufficient to appreciably affect the shape of a demand curve. (Recall that we wished to consider only relatively small areas in our segmenting procedure) The second problem involved the synthesized "measured" flows in the larger mains. Since the field measurements were made on different days over a 4-month period, a procedure for synthesis of measured data to a common day was developed, Appendix WSU4. Errors of 10% while satisfactory for other purposes, could have a noticeable effect on the demand curves. A third source of inaccuracy in the node demands arose in the selection of average daily consumptions at nodes. In a distribution system as old as Boston's, leakage is fairly large, ranging from 10-20% of the daily average input. In our scaling-up process we implicitly assumed that leakage was proportional to consumption at each node. This was probably not completely true. The fourth source of error in estimating localized consumptions is the error inherent in the field data gathering.

The above inconsistancies did not cause much trouble at an individual node. Indeed, at any given hour, the predicted pipe flow varied from the measured flow by only 5-10%. However, considering the network as a whole, a total discrepancy between inputs and outputs of even 5% is not tolerable. To assure that inputs and outputs for the overall system balanced at all hours, the following additional steps were included in our procedure:

The basic dimensionless demand curves were first obtained by inspection of the synthesized field data. Ten such curves resulted. Of these, some were so similar that it was concluded that five or six curves would adequately describe the shape of the demand at any node. Thus, one basic curve pertained to an industrial area, another to a low income residential area, and so on. This was an important simplification, since it allowed us to apply demand curves to new but similar areas. The question then arose as to how much total demand would be accounted for by each type of basic curve.

This last question was resolved by a mathematical technique known as <u>Linear Programming</u> (L.P.). The basic L.P. problem is that of maximizing a linear expression subject to linear constraints. For example,

$$\text{Maximize} \quad 6Y + 4X + 3Z \qquad (1)$$

$$\text{if} \quad \begin{aligned} 1Y + 2X &\geq 10 \\ Z &\leq 8 \\ 3Y + Z &\geq 11 \\ 2X &\geq 1 \end{aligned} \qquad (2)$$

That is, find the numerical values of X, Y, and Z which will satisfy the constraints (2) and give a maximum value for the objective function (1). Although many different values may satisfy (2), we are interested only in that particular set of X, Y, and Z which produce the largest value of (1). Consider now a general three parameter L.P. problem.

$$\text{Maximize} \quad C_1X_1 + C_2X_2 + C_3X_3$$

$$\text{if} \quad \begin{aligned} a_{11}X_1 + a_{12}X_2 + a_{13}X_3 &\leq ,=, \geq b_1 \\ a_{21}X_1 + a_{22}X_2 + a_{23}X_3 &\leq ,=, \geq b_2 \\ \vdots \qquad \vdots \qquad \vdots \\ a_{m1}X_1 + a_{m2}X_2 + a_{m3}X_3 &\leq ,=, \geq b_m \end{aligned}$$

This can be thought of as a network problem with three basic dimensionless demand curves.

X_1 = total flow assigned to Curve 1

X_2 = total flow assigned to Curve 2

X_3 = total flow assigned to Curve 3

$C_1 = C_2 = C_3 = 1.0$

$b_1, b_2, \ldots b_m$ are the actual inputs to the network at hour 1, hour 2, ..., hour m. The a_{11}, a_{12}, a_{13} are the ordinates of demand curves 1,2, and 3 at hour 1, and a_{m1}, a_{12}, a_{13} are the same ordinates at hour m. Although for the physical problem only equalities should be used in the constraint equations (signifying a balance of inputs and outputs at each hour), this is too severe a restriction for the L.P. procedure. However, the use of inequalities results in values of X_1, X_2, X_3 which very nearly satisfy the equalities (that is, our error at any hour is small).

Applying L.P. to the Southern High or Southern Low Services, we obtained the total amount of demand that was accounted for by each type of dimensionless demand curve in order that network inputs and outputs very nearly balance. The basic curves were then assigned to nodes so that the total flow assigned to each curve corresponded to the L.P. output.

One final adjustment was then made. Since our L.P. constraints were not exact equalities, hourly inputs and outputs for a network still did not exactly balance. At this point, for each hour, a single linear scaling factor was used for all nodes so that input equaled output for that hour.

The procedure for deriving 24-hour node consumptions can be summarized as follows:

(i) Determine daily average flows for each node. Scale to study day.
(ii) Identify areas that can be reasonably isolated. Calculate basic dimensionless demand curves from synthesized data.
(iii) Use linear programming to obtain total daily flow represented by each basic curve.
(iv) Assign curves to nodes, generate 24-hour curves at each node.
(v) Scale node curves at each hour so that hourly inputs and total demands balance.

Unsuccessful attempts were made to arbitrarily shift assigned consumptions from curve to curve while on the trail of hunches about consumption patterns. It was found that the L.P. results were indeed much better than could be obtained any other way.

Future Demand

Hourly variations in demand can be readily ascertained by applying results of the preceding section. Using projected future land use and population densities, the average future node demands can be estimated. Again, projected land use will determine the type of basic curve to be assigned to each node. (We assume that the basic demand curve shapes do not change) For example, a node that was represented by a low income residential curve in 1967 may require an industrial curve in 1985. With the averages and the curve designations, 24-hour node demands result. The total input for a given hour is simply the sum of the node demands for that hour. The network can then be analyzed for any hour of a future day.

Appendix - Programs

A series of computer programs has been developed for time-sharing use to facilitate the numerical computations involved in obtaining the demand curves. These programs require very little core storage. Less than 100 seconds of computer time are required to run the complete sequence of programs. Figure 1 shows the sequence for use of these programs and will be helpful to follow when reading the following descriptions:

DEMAND

This program, written in TELCOMP, receives the synthesized pipe flows for a given area and then computes and plots the basic dimensionless demand curve. All input is from the teletype, although the data may be read in from paper tape.

CURGEN (Curve Generator)

Fortran IV, Applied Logic Corporation (ALC) system. Input to this program is from two drum files, INOD and CURVE·REC. The first of these contains the node number and average flow (MGD) for each node. CURVE·REC contains the ordinates of the dimensionless demand curves. Output is a 24-hour demand curve (dimensional) for each node in the network.

SUMALL

Fortran IV, ALC system. Input is the output from CURGEN, a drum file entitled NODREC. This program computes the total demand of the network on an hourly basis. Output is hour, demand for each hour of the day. (24 sets of numbers)

LINEP (Linear Programming algorithm)

Card Fortran, General Electric Company (G.E.) system. G.E. manual contains a detailed description of LINEP. Input is from the teletype (via paper tape). Output is the maximum value of the objective function and the amount of flow assigned to each dimensionless demand curve.

ADJUST

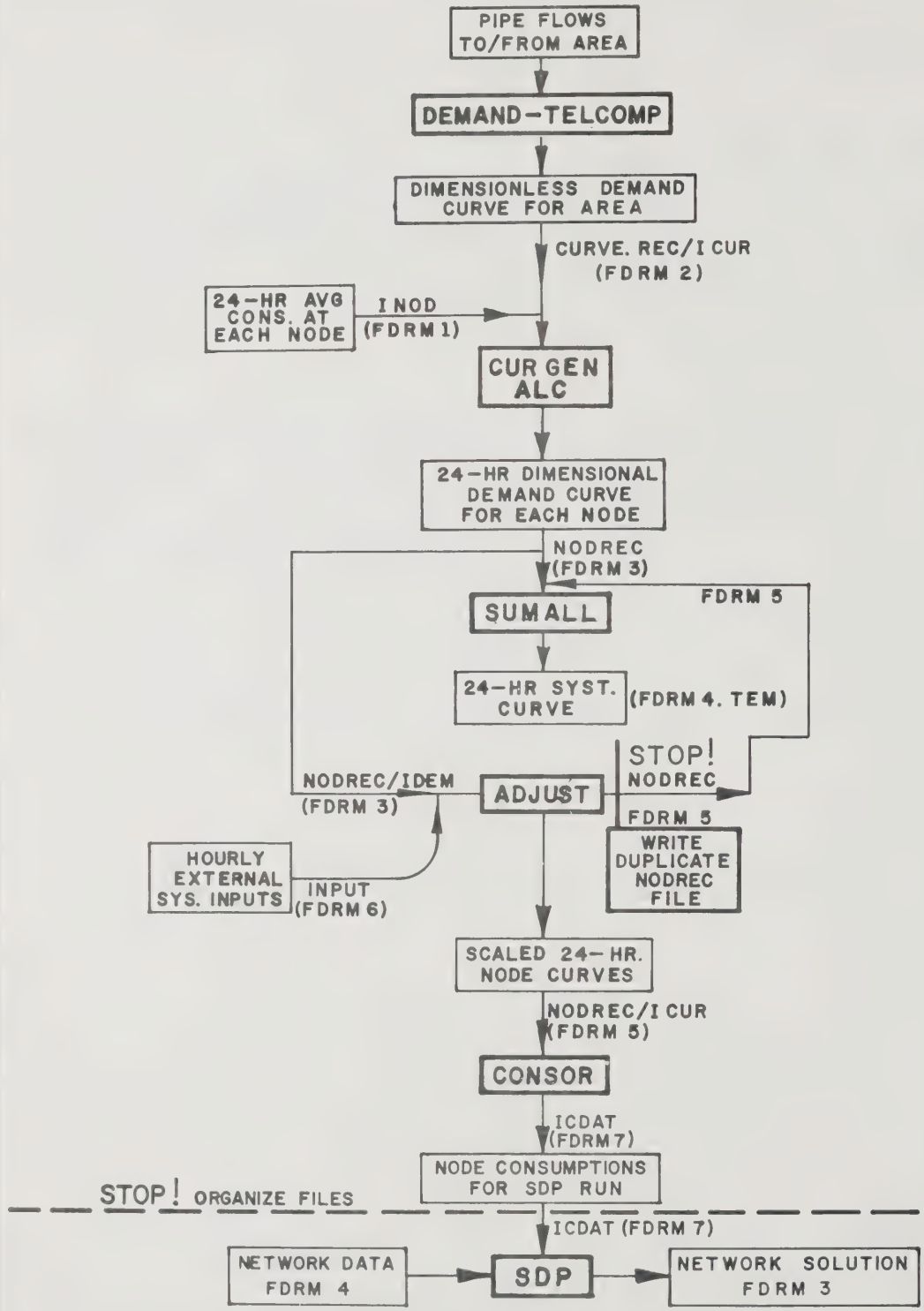
Fortran IV, ALC system. Inputs are NODREC and INPUT from the drum files. These are, respectively, the 24-hour demand curves from CURGEN and the hourly total inputs to the network. The program scales the hourly flow at each node in such a way that the total network demand equals the total input at each hour. The output is a new NODREC file.

CONSOR (Consumption Sorter)

Fortran IV, ALC system. Input is the NODREC file from ADJUST. The demands are sorted in such a way that a data file for SDP is created. This is the ICDAT (Input Consumption Data) file and is called for in the running of the generalized network analysis program (SDP).

General Use

The programs would be used in the following order: First, run DEMAND to get dimensionless curves. Then CURGEN yields node demands. SUMALL indicates how close inputs and outputs are to each other and hence whether or not linear programming is necessary. If it is, LINEP is run, and the output is used to run CURGEN again. ADJUST then produces the 24-hour demand curves that can be input to CONSOR. The output from CONSOR is the consumptions, in proper format, for use when analyzing the network with SDP.



PROGRAM RUNNING SEQUENCE

BOSTON WATER

FIGURE-AWSU 3

```
1.1 DEMAND N
1.11 Q4=0
1.12 QT=0
1.2 READ X[N[I,J] FOR J=1:1:24 FOR I=1:1:N
1.21 LINE FOR L=1:1:4
1.3 DO PART 2 FOR J=1:1:24

2.1 Q[J]=X[1,J]-X[2,J]-X[3,J]-X[4,J]-X[5,J]
2.2 SET Q4=Q[J] IF Q[J]>Q4
2.3 QT=QT+Q[J]
2.4 DO PART 3 IF J=24

3.1 QAV=QT/24
3.2 QN[J]=Q[J]/QAV FOR J=1:1:24
3.3 TYPE FORM 1
3.31 LINE
3.4 TYPE J,Q[J],QN[J] IN FORM 2 FOR J=1:1:24
3.41 LINE
3.42 LINE
3.5 DO PART 4

4.1 PLOT 2*Q[J]/Q4-1,-1,1,0 ON J FOR J=1:1:24
```

```
C       FOR EN PROGRAM
C       GENERATES 24 HR. RECORDS AT EACH NODE  INPUT CURVE RECORDS*ICUR
C       AND NODE AVERAGES:INODE
        DIMENSION X(150,24),Q(10,24)
        INTEGER JUCH
100     FORMAT(2I,1F)
200     FORMAT(12F)
300     FORMAT(2I)
 60     FORMAT(1X,2X,'NODE:',1X,I3)
 70     FORMAT(12F6.2)
        FORMAT(1X,'CHANNELS:INODE,ICUR,JUCH'//)
  9     FORMAT(3I)
C       N=NO. OF STD.CURVES, NM=NO. OF METERS
        TYPE 5
        ACCEPT 9,INODE,ICUR,JUCH
        READ(INODE,300)N,NM
        READ(ICUR,200)((Q(I,J),J=1,24),I=1,N)
C       NC.=THE STD. CURVE TO BE USED
C       I=II=NODE NUMBER
        DO 5 I=1,NM
        READ(INODE,100)II,NC,XAV
        DO 5 J=1,24
5       X(I,J)=Q(NC,J)*XAV
        DO 6 I=1,NM
        WRITE(JUCH,60) I
6       WRITE(JUCH,70)(X(I,J),J=1,24)
        CALL EXIT
        END
```

*

```
C       SUMALL PROGRAM
C       COMPUTES HOURLY SYSTEM FLOW
        DIMENSION X(30,24),XT(24)
20      FORMAT(3I)
30      FORMAT(////,12F6.2)
40      FORMAT(12F6.2)
50      FORMAT(1X,'TYPE CHANNELS:IN,ITT,IOUT')
60      FORMAT(1X,'TYPE NO. OF NODES')
100     FORMAT(1X,'HOUR',6X,'FLOW')
200     FORMAT(1X,I2,8X,F6.2)
        TYPE 50
        ACCEPT 20,IN,ITT,IOUT
        TYPE 60
        READ(ITT,20) N
        DO 1 I=1,N
        READ(IN,30)(X(I,J),J=1,12)
1       READ(IN,40)(X(I,J),J=13,24)
        DO 2 J=1,24
        XT(J)=0.
        DO 2 I=1,N
2       XT(J)=XT(J)+X(I,J)
        WRITE(IOUT,100)
        WRITE(IOUT,200)(J,XT(J),J=1,24)
        CALL EXIT
        END
```

*

```
C       ADJUST PROGRAM
        DIMENSION X(80,24),Y(80,24),Q(25),RA(25),XT(80)
10      FORMAT(/,12F6.2)
20      FORMAT(12F6.2)
30      FORMAT(12F)
40      FORMAT(I)
60      FORMAT(1X,'NODE',2X,I3)
        TYPE 8
8       FORMAT(1X,'CHANNELS:IDEM,INPT,IOUT',//)
        ACCEPT 50,IDEM,INPT,IOUT
50      FORMAT(4I)
        READ(INPT,40) N
        READ(INPT,30)(Q(J),J=1,24)
        DO 2 I=1,N
        READ(IDEM,10)(X(I,J),J=1,12)
2       READ(IDEM,20)(X(I,J),J=13,24)
        DO 5 J=1,24
        XT(J)=0.
        DO 4 I=1,N
4       XT(J)=XT(J)+X(I,J)
5       RA(J)=Q(J)/XT(J)
        DO 1 I=1,N
        DO 1 J=1,24
1       Y(I,J)=X(I,J)*RA(J)
        DO 3 I=1,N
        WRITE(IOUT,60) I
3       WRITE(IOUT,20)(Y(I,J),J=1,24)
        CALL EXIT
        END
```

*

```
C       CONSOR PROGRAM
        DIMENSION X(80,24),XIN(80),Q(80),XI(20),NUM(20)
10      FORMAT(/,12F6.2)
20      FORMAT(12F6.2)
30      FORMAT(1I,1F)
31      FORMAT(1X,'TYPE NODE,INPUT(ONE LINE PER NODE)',//)
40      FORMAT(3I)
41      FORMAT(1X,'TYPE #NODES,#INPUTS,#HOURS',//)
50      FORMAT(1X,'TYPE CHANNELS:ICUR,ITT,IOT',//)
60      FORMAT(1X,'TYPE HOUR',//)
100     FORMAT(1X,I3,',',F6.2)
        TYPE 50
        ACCEPT 40,ICUR,ITT,IOT
        TYPE 41
        READ(ITT,40) NN,NIN,NHR
        DO 1 I=1,NN
        READ(ICUR,10)(X(I,J),J=1,12)
1       READ(ICUR,20)(X(I,J),J=13,24)
        DO 5 K=1,NHR
        TYPE 60
        READ(ITT,40) KHR
        DO 2 I=1,NN
2       XIN(I)=0.
        TYPE 31
        READ(ITT,30)(NUM(L),XI(L),L=1,NIN)
        DO 3 L=1,NIN
        WRITE(ITT,100) NUM(L),XI(L)
        JJ=NUM(L)
3       XIN(JJ)=XI(L)
        DO 4 I=1,NN
4       Q(I)=-X(I,KHR)+XIN(I)
        WRITE(IOT,100)(I,Q(I),I=1,NN)
5       CONTINUE
        CALL EXIT
        END
```

*

Boston Water

APPENDIX DN1

WATER DISTRIBUTION SYSTEMS ANALYSIS

Charles A. Maguire & Associates

Boston Hartford Providence

WATER DISTRIBUTION SYSTEMS ANALYSIS: PART I

By Uri Shamir[1] and Charles D. D. Howard[2]

SYNOPSIS

A generalized method is presented for solving non-linear networks under steady-state flow conditions. Unknowns may be combinations of heads, consumptions or element resistances. In addition to pipes, the network may include other types of elements, such as pumps and valves.

An iterative scheme employing the Newton-Raphson technique is used to solve the equations of continuity simultaneously at all nodes. Conditions for convergence of the scheme, and the possibility of insolvable problems is discussed. A sensitivity analysis is presented, from which the effect of a small change in a selected variable upon other variables may be determined.

The method is well suited for solution by a digital computer. It is a powerful and flexible tool for on-line engineering design and decision making, as well as for real time control and operation of networks by digital computers.

---

[1] Asst. Prof., Dept. of Civil Engrg., M.I.T., Cambridge, Mass.

[2] Project Engineer and Head, Computer Applications, Chas. A. Maguire and Assoc., Boston, Mass.

INTRODUCTION

A network of pipes and hydraulic elements (valves, pumps, reservoirs) is considered solved when the heads and consumptions at all nodes in the network are known. Obtaining the solution, as defined herein, consists of finding the values of the specified unknowns which satisfy the following physical laws of the network:

(1) Preservation of mass continuity at each node

(2) For each element there is a known relationship between discharge and energy gradient

The Hazen-Williams equation, commonly used for water distribution studies, was selected as the law relating pipe discharge to energy loss. Other equivalent equations can be selected if desired.

Whether for the analysis of an existing network or for the design of a new one, the engineer needs the capability to solve for various combinations of unknowns, under many loading conditions. The analytical tools which have been developed to date make this task a lengthy and tedious process. The present work takes full advantage of the Newton-Raphson method to solve directly for combinations of unknowns which may include heads, consumptions and element resistances. The method incorporates pumps, valves and other elements into the method of solution, without recourse to special external procedures.

The generalized steady-state solution of a water distribution network is but a small part of an overall system analysis. Additional aspects such as acquisition, processing storing and retrieval of data, control and operation of a network, economic and social implications and the effective use

of digital computers will be discussed in a future paper.

REVIEW OF PREVIOUS WORK

The oldest method for systematic solution of distribution networks, and the one still most commonly used, is the Hardy Cross method[3]. This method is well suited for solution by hand, and is easily adapted for machine computation. Computer programs written to perform the Hardy Cross analysis are described by Hoag and Weinberg[4], Graves and Branscome[5], Adams[6] and Dillingham[7].

Electronic network analyzers are discussed by McIlroy[8], McPherson and Radziul[9] and others. A summary of methods and techniques was presented by

---

[3] "Analysis of Flow in Networks of Conduits or Conductors" by Hardy Cross, Bull. No. 286, Univ. of Illinois Engineering Experimental Station, Urbana, Ill., 1936.

[4] "Pipeline Network Analysis by Electronic Digital Computer" by L. N. Hoag and G. Weinberg, Journal of the American Water Works Association, Vol. 49, 1957, pp. 517-524.

[5] "Digital Computers for Pipeline Network Analysis" by Q. B. Graves and D. Branscome, Journal of the Sanitary Engineering Division, ASCE, Vol. 84, No. SA2, April 1958.

[6] "Distribution Analysis by Electronic Computer" by R. W. Adams, Journal of the Institute of Water Engineers, Vol. 15, 1961, pp. 415-428.

[7] "Computer Analysis of Water Distribution Systems. Part 2" by J. H. Dillingham, Water and Sewage Works, February 1967, pp. 43-45.

[8] "Direct Reading Electric Analyzer for Pipeline Networks" by M. S. McIlroy, Journal of the American Water Works Association, Vol. 42, April 1950, p. 347.

[9] "Water Distribution Design and the McIlroy Network Analyzer" by M. B. McPherson and J. V. Radziul, Journal of the Hydraulic Division, ASCE, Vol. 84, No. HY2, April 1958.

McPherson[10].

Other methods of mathematical solution of networks resulted from work on electrical networks. Warga[11] applied Duffin's[12] work on nonlinear networks to distribution networks. Warga proved the existence of a unique solution for the heads at the nodes under steady state flows in a network whose elements (an element is a link connecting two nodes) satisfy certain conditions. If the general law relating flow and head loss in any element is given by

$$Q_{ji} = f_{ji}(H_i - H_j)$$

then these conditions are

(a) $f_{ji}(x) = - f_{ij}(-x)$

(b) $f_{ji}(x)$ is continuous for all x.

(c) For all couples (j, i), $f_{ji}(x)$ is non-decreasing as x increases.

(d) There exists a path between any two nodes in the network along which every element has an $f_{ji}(x)$ which increases as x increases and takes on all values (i.e., $-\infty < f_{ji} < \infty$).

Warga discusses in his paper two iterative procedures for solving a network which satisfies the above conditions. One procedure always converges,

---

[10] "Application of System Analyzers--A Summary" by M. B. McPherson, Water and Sewage Works, Reference Number, 1962, pp. R53-R67.

[11] "Determination of Steady State Flows and Currents in a Network" by J. Warga, Proc. Instrument Society of America, Vol. 9, pt. 5, 1954, paper 54-43-4.

[12] "Nonlinear Networks" by R. J. Duffin, Bulletin of the American Mathematical Society, Vol. 53, 1947, pp. 963-971.

although slowly, from any starting assumption. The other procedure, the Newton-Raphson technique, converges rapidly from a reasonable assumption but may not converge at all if the intial assumption is unreasonable.

The existence and uniqueness of the solution of a network has not been considered for the case when the unknowns include consumptions at nodes and element resistances. The problem of existence and uniqueness is even more complicated when elements such as pumps, for which condition (c) above does not hold, are included in the network.

Martin and Peters[13] used the Newton-Raphson method in a computer program to solve for the unknown heads at the nodes of a network of pipes (no pumps or valves). They reported no difficulty with convergence.

Shamir[14] used the same method as one of a set of computer programs for economic analysis of water distribution networks. These programs, which were subsequently used by Lemieux[15] and Smith[16], solved for unknown heads, and convergence was always achieved. Giudice[17] added a sensitivity analysis and considered the case of more than one fixed head.

---

[13] "The Application of Newton's Method to Network Analysis by Digital Computer" by D. W. Martin and G. Peters, Journal of the Institute of Water Engineers, Vol. 17, 1963, pp. 115-129.

[14] "Minimum Cost Design of Water Distribution Networks" by U. Shamir, Unpublished Report, 1964, Department of Civil Engineering, M.I.T.

[15] "Minimum Cost Design of Water-Pipe Networks" by P. F. Lemieux, M.Sc. Thesis, 1965, Department of Civil Engineering, M.I.T.

[16] "Minimum Cost Design of Linearly Restrained Water Distribution Networks" by D. V. Smith, M.Sc. Thesis, 1966, Department of Civil Engineering, M.I.T.

[17] "Analysis of Pipe Networks Based on the Newton-Raphson Method" by J. J. Giudice, M.Sc. Thesis, 1965, Department of Civil Engineering, M.I.T.

Pitchai[18] used the Newton-Raphson method and treated networks with pumps as boundary conditions. The conditions at the pumps were satisfied outside the general network solution (the pumps were not included directly into the analysis as elements in the network). Pitchai does not present proof of the convergence of the method, nor of the existence of a solution for a network including pumps. He stresses, however, that when a solution is known to exist (based on engineering judgment) the method converges rapidly.

In summary, previous studies of pipeline networks have extensively treated the problem of solving for heads at the nodes, but very little has been done to solve for other types of unknowns. Studies were restricted to consideration of networks of pipes and included other elements (such as pumps) by special procedures which were external to the basic method of network solution.

SOLUTION OF A PIPELINE NETWORK

Consider a network of NJ nodes and NL pipes. The statement of continuity for all nodes is

$$F_j = \sum_{i=1}^{NJ} Q_{ji} + C_j = 0 \qquad j = 1,\ldots,NJ \qquad (1)$$

---

[18] "A Model for Designing Water Distribution Pipe Networks" by R. Pitchai, Ph.D. Thesis, 1966, Division of Engineering and Applied Physics, Harvard University.

where Q_{ji}[19] is the discharge from i to j (Q_{ji} = 0 when no pipe connects nodes j and i), and C_j is the consumption at node j (C is positive when it is an input to the node).

The Hazen-Williams equation can be written

$$Q = 6.2 \times 10^{-4} C_{HW} D^{2.63} \left(\frac{\Delta H}{L} \right)^{0.54} \tag{2}$$

where Q = discharge, in cfs

C_{HW} = the Hazen-Williams coefficient of the pipe

D = pipe diameter, in inches

ΔH = head loss along the pipe, in feet

L = pipe length, in feet

This equation is used in the following form:

$$Q_{ji} = \frac{H_i - H_j}{R_{ij}^{0.54} |H_i - H_j|^{0.46}} \tag{3}$$

where R_{ij}, the resistance of the pipe connecting nodes i and j is given by

$$R_{ij} = \frac{850260\ L_{ij}}{C_{HW_{ij}}^{1.85}\ D_{ij}^{4.87}} \tag{4}$$

Equation 3 is written in a form which guarantees a consistent sign

---

[19] Symbols are defined where they first appear and are compiled in an Appendix.

convention for discharge (i.e., $Q_{ji} > 0$ means flow from i to j). Equation 3 can now be used to write equation 1 (the continuity equation) in terms of heads and consumptions at nodes and pipe resistances as follows:

$$F_j = \sum_{i=1}^{NJ} \frac{H_i - H_j}{R_{ij}^{0.54} |H_i - H_j|^{0.46}} + C_j = 0 \quad j = 1,\ldots,NJ \tag{5}$$

The elements in the summation of equation 5 are non-zero only if nodes i and j are connected by a network element. This will be implied in all subsequent summations.

For a network, if $F_j = 0$ is satisfied at all nodes then the external balance equation

$$\sum_{j=1}^{NJ} C_j = 0 \tag{6}$$

is satisfied.

Since there are NJ simultaneous equations one can solve for NJ unknowns. They may be heads, consumptions or resistances. For the network to be solvable the combination of unknowns must satisfy the conditions outlined subsequently. As the equations are non-linear, the solution is achieved by successive iterations, using a suitable method which achieves convergence. The chosen method of solution, the Newton-Raphson technique, finds a new set of improvements or corrections to the values of the unknowns in each iteration. The improvements are computed from the first term of a Taylor expansion about the present state of the solution.

The method may be conveniently illustrated for the one-dimensional case shown in Figure 1 as follows. The value x_o is sought such that

$$f(x)\Big|_{x = x_o} = f(x_o) = 0$$

At the k-th iteration the approximation for x_o is denoted by x_k. The next approximation is given by

$$x_{k+1} = x_k + \Delta x_k = x_k - \frac{f(x_k)}{\frac{df(x_k)}{dx}} \tag{7}$$

where $\frac{df(x_k)}{dx}$ is the derivative of f(x) evaluated at x_k. The equation for the k-th improvement Δx_k, can then be written as

$$f(x) + \frac{df}{dx} \Delta x = 0 \tag{8}$$

where it is understood that both f(x) and its derivative are evaluated using the present value of x.

When there are n equations to be satisfied $[f_1(x_1,\ldots,x_n) = 0,\ldots, f_n(x_1,\ldots,x_n) = 0]$ and n unknowns $(x_1,\ldots,x_n)$ to be solved for, the set of n improvements $(\Delta x_1,\ldots, \Delta x_n)$ are the solution of the following set of n simultaneous linear equations

$$f_j(x_1,\ldots,x_n) + \sum_{i=1}^{n} \frac{\partial f_j}{\partial x_i} \Delta x_i = 0 \qquad j = 1,\ldots,n \tag{9}$$

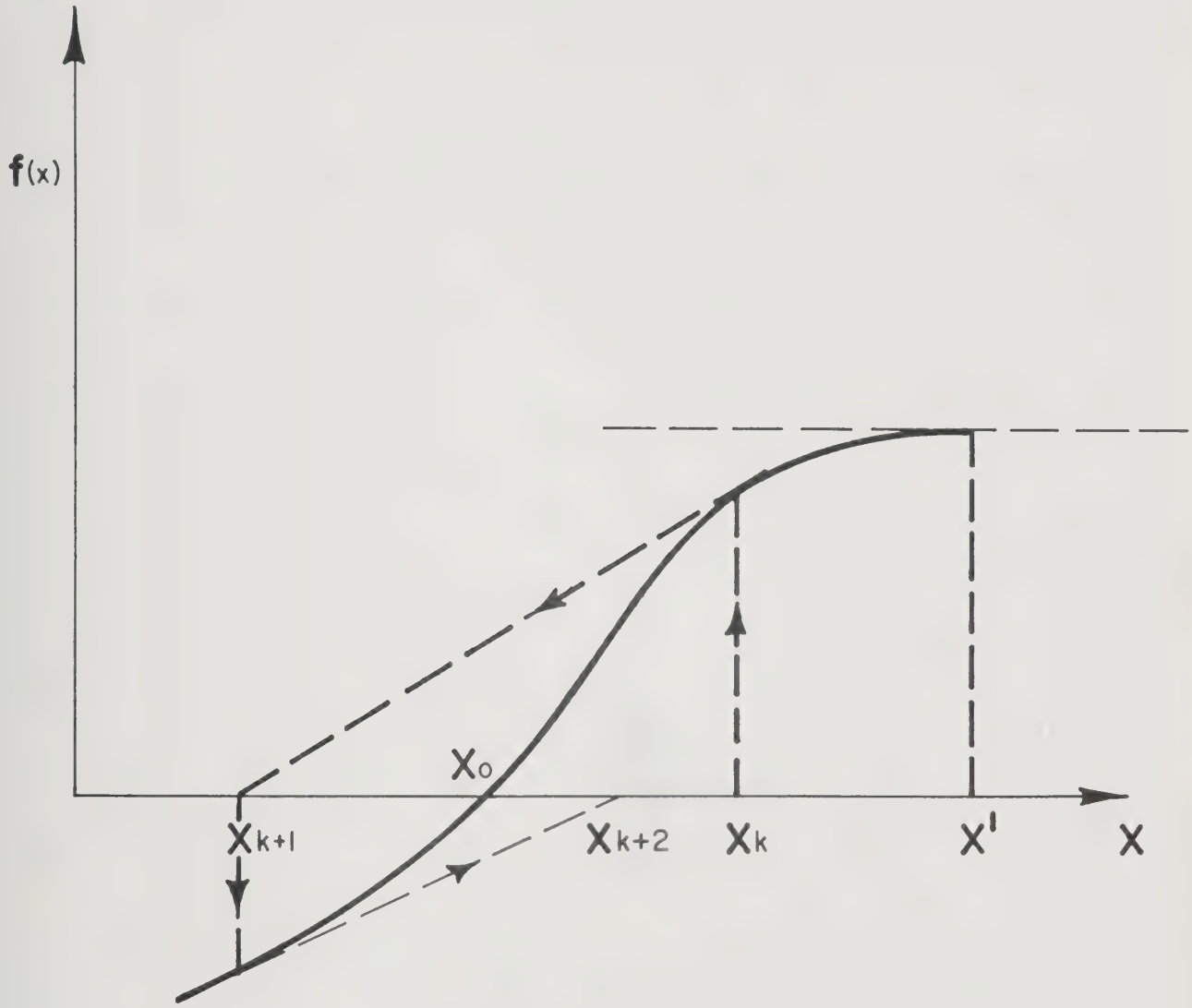


FIGURE-1: ILLUSTRATION OF THE NEWTON-RAPHSON METHOD FOR THE ONE DIMENSIONAL CASE.

Consider now the network, having NJ nodes. The set of unknown heads is denoted by $\bar{H}$, the set of unknown consumptions by $\bar{C}$ and the set of unknown resistances by $\bar{R}$. The NJ simultaneous equations for the corrections are

$$F_j(\bar{R}, \bar{H}, \bar{C}) + \sum_{R_{ij} \epsilon \bar{R}} \frac{\partial F_j}{\partial R_{ij}} \Delta R_{ij} + \sum_{H_i \epsilon \bar{H}} \frac{\partial F_j}{\partial H_i} \Delta H_i + \sum_{C_i \epsilon \bar{C}} \delta_{ij} \Delta C_i = 0$$

$$j = 1, \ldots, NJ \qquad (10)$$

Where $H_i \epsilon \bar{H}$ signifies "H_i is in the set $\bar{H}$" (i.e., H_i is an unknown), and δ_{ij} is the Kroneker delta ($\delta_{ij} = 1$ when $i = j$ and $\delta_{ij} = 0$ otherwise). At each iteration the set of equation given by equation 10 may be solved for the corrections $\Delta R_{ij} (R_{ij} \epsilon \bar{R})$, $\Delta H_i (H_i \epsilon \bar{H})$ and $\Delta C_i (C_i \epsilon \bar{C})$. These corrections are then added algebraically to the present values of the unknowns to obtain a new estimate of the solution. A check is then made to determine if all equations given by equation 5 are satisfied to within some specified error criterion. This error criterion is the amount by which any F_j may be different from zero, and represents the maximum allowable unbalanced discharge at any node. If in checking the present solution the error criterion is not met at any of the nodes, a new iteration is begun. The magnitude of the error criterion has a major influence on the number of iterations which will be required to reach the accepted solution.

The partial derivations in equation 10, obtained from equation 5, are given by

$$\frac{\partial F_j}{\partial H_i} = \frac{0.54}{R_{ij}^{0.54} |H_i - H_j|^{0.46}} = \frac{\partial F_i}{\partial H_j} \qquad (11)$$

$$\frac{\partial F_j}{\partial H_j} = - \sum_{i \neq j} \frac{\partial F_j}{\partial H_i} \tag{12}$$

and

$$\frac{\partial F_j}{\partial R_{ij}} = \frac{-0.54\ (H_i - H_j)}{R_{ij}^{1.54} |H_i - H_j|^{0.46}} \tag{13}$$

Equation 10 can be written in matrix form as follows

$$\begin{bmatrix} \cdots \frac{\partial F_1}{\partial R_{pq}} \cdots\cdots \frac{\partial F_1}{\partial H_s} \cdots\cdots \frac{\partial F_1}{\partial C_t} \cdots \\ \vdots \qquad\qquad \vdots \qquad\qquad \vdots \\ \cdots \frac{\partial F_{NJ}}{\partial R_{pq}} \cdots\cdots \frac{\partial F_{NJ}}{\partial H_s} \cdots\cdots \frac{\partial F_{NJ}}{\partial C_t} \cdots \end{bmatrix} \begin{bmatrix} \vdots \\ \Delta R_{pg} \\ \vdots \\ \Delta H_s \\ \vdots \\ \Delta C_t \\ \vdots \end{bmatrix} = \begin{bmatrix} -F_1 \\ \vdots \\ -F_{NJ} \end{bmatrix} \tag{14}$$

The matrix of derivatives on the left hand side is called the Jacobian of the set of equations. The numerical values in this matrix and on the right hand side vary from one iteration to the next, as they are computed at each iteration with a new set of values for the unknowns. The solution of equation 14 was readily obtained for each iteration by using the Gauss-Jordan elimination procedure.

To illustrate the structure of equation 14 it is written for the network shown in Figure 2 with NJ = 5 and NL = 7.

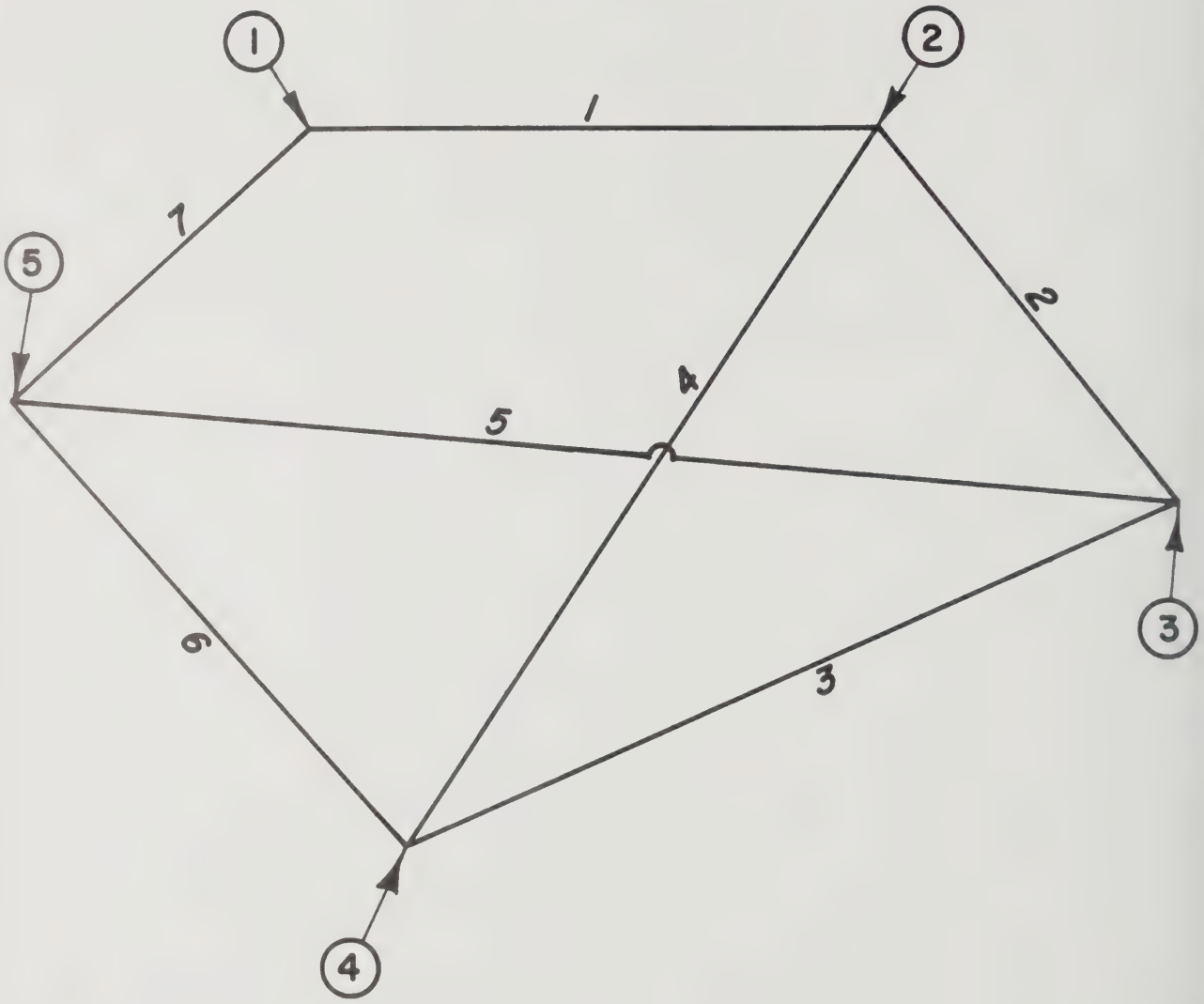


FIGURE-2: A SAMPLE NETWORK

The unknowns for this example are:

$$\bar{H} = (H_1, H_3)$$

$$\bar{C} = (C_3, C_4)$$

$$\bar{R} = (R_{24}) = (R_4)$$

And equation 14 takes the following form

$$\begin{bmatrix} 0 & \frac{\partial F_1}{H_1} & 0 & 0 & 0 \\ \frac{\partial F_2}{\partial R_4} & \frac{\partial F_2}{\partial H_1} & \frac{\partial F_2}{\partial H_3} & 0 & 0 \\ 0 & 0 & \frac{\partial F_3}{\partial H_3} & 1 & 0 \\ \frac{\partial F_4}{\partial R_4} & 0 & \frac{\partial F_4}{\partial H_3} & 0 & 1 \\ 0 & \frac{\partial F_5}{\partial H_1} & \frac{\partial F_5}{\partial H_3} & 0 & 0 \end{bmatrix} \begin{bmatrix} \Delta R_4 \\ \Delta H_1 \\ \Delta H_3 \\ \Delta C_3 \\ \Delta C_4 \end{bmatrix} = \begin{bmatrix} -F_1 \\ -F_2 \\ -F_3 \\ -F_4 \\ -F_5 \end{bmatrix} \quad (15)$$

where the derivatives are given by equations 11, 12, and 13.

Since the continuity equations involve only differences between heads it is necessary to specify at least one head to establish a datum. If the problem is to solve for all the heads in the network, given all the consumptions and resistances, then one has to fix one head, consider one

consumption or resistance as unknown and solve for it together with the (NJ - 1) unknown heads.

SYSTEM ELEMENTS OTHER THAN PIPES

In addition to pipes, a water distribution system contains a variety of elements. These may be pumps, valves, elevated tanks, hydrants and other types of control and measuring devices. It is essential to be able to incorporate the special characteristics of these elements into the analysis, and to be able to solve the system as it physically exists. The method of presented herein is ideally suited to perform such an analysis.

Consider the case for which the link connecting nodes k and ℓ of a network is an element other than a pipe, such as a pump or valve. Then for the link $k\ell$ we have

$$Q_{k\ell} = f_E(H_k - H_\ell) = - Q_{\ell k} \tag{16}$$

where f_E is a given function. Equation 16 may be the characteristic curve of a pump, a loss curve for a valve, etc. In equation 14, the derivatives, with respect to H_k and H_ℓ, are given by

$$\frac{\partial F_k}{\partial H_k} = - \sum_{\substack{j \neq k \\ j \neq \ell}} \frac{0.54}{R_{kj}^{0.54} |H_k - H_j|^{0.46}} + \frac{\partial f_E}{\partial H_k} \tag{17}$$

$$\frac{\partial F_k}{\partial H_\ell} = \frac{\partial f_E}{\partial H_\ell} \tag{18}$$

$$\frac{\partial F_\ell}{\partial H_k} = - \frac{\partial f_E}{\partial H_k} \tag{19}$$

and

$$\frac{\partial F_\ell}{\partial H_\ell} = - \sum_{\substack{j \neq \ell \\ j \neq k}} \frac{0.54}{R_{\ell j}^{0.54} |H_\ell - H_j|^{0.46}} - \frac{\partial f_E}{\partial H_\ell} \tag{20}$$

all other derivatives in equation 14 remaining the same (given by equations 11, 12, 13). f_E and its derivatives can be computed from measured data taken from field tests of the element being considered.

As an example, consider the network shown in Figure 2. We now replace the pipe connecting nodes 3 and 5 by a pump for which

$$Q_{35} = f_E = Q_o - \alpha(H_3 - H_5)^\beta \qquad H_3 > H_5 \tag{21a}$$

$$Q_{35} = f_E = 0 \qquad H_3 < H_5 \tag{21b}$$

Equation 21 implies that the pump operates only as long as the head at node 3 is higher than that at node 5, i.e., it always pumps from node 5 to node 3. For this case the terms $\frac{\partial F_3}{\partial H_3}$; $\frac{\partial F_3}{\partial H_5}$; $\frac{\partial F_5}{\partial H_3}$ and $\frac{\partial F_5}{\partial H_5}$ are computed from equations 17 - 20, using f_E from equation 21. All other terms in the matrix of derivatives are the same as in equation 15.

Equation 21 can be used to illustrate the difficulties which may arise when elements other than pipes are considered. In general, the

characteristic equation for each type of element considered (pump, valve, etc.) is different. Although the function f_E in equation 21 is continuous, its derivatives are not. This means that when F_3, F_5 or their derivatives with respect to H_3 or H_5 are computed at any iteration of the solution, a check must be made to determine if H_3 is larger or smaller than H_5. A decision must then be made to use either 21a or 21b, whichever applies. The convergence of the iterative scheme can not be guaranteed when any of the characteristic functions of elements in the network do not have continuous derivatives. This will be discussed in a later section.

Any type of element may be included in the network analysis as long as its characteristic curve is available. A pipe can be considered as just one of many types of elements, its characteristic curve being given by the Hazen-Williams equation.

A set of programs to perform the analysis was developed and implemented on a digital computer in a time sharing environment.

APPLICATIONS

The present method of analysis has broad application to water distribution systems analysis. Pumps, valves, hydrant-pumper combinations or other network elements with known head-discharge characteristics can be incorporated directly into the solution, without recourse to external ad hoc procedures. Alternatively it is possible to calculate a required element characteristic for specified system performance. For example, it is possible to compute directly the pipe resistances required to produce specified pressures and consumptions. Trial and error procedures are thereby eliminated.

Of major importance is the high degree of flexibility afforded in setting up the data for a run or changing the basic network layout for subsequent runs. Nodes or elements can be added or deleted from the basic data file without a major reshuffle.

The location and types of unknowns can be freely interchanged from run to run without any changes in the data or ordering of the computations. Consequently, the method is extremely well suited to real time use for decision making as part of a man-machine team. It is also well suited for use in the control and operation of an existing network. This last application is a specialized topic and will be discussed in a later paper.

SOLVABILITY OF NETWORKS

To demonstrate the fact that one cannot solve for <u>any</u> set of NJ unknowns in a network of NJ nodes, consider the extremely unfavorable case for which the NJ unknowns (which include heads, consumptions and resistances) are all concentrated in one region of the network. It should be intuitively obvious that even if the flows and heads at the pipes coming into this area are all known, it is impossible to solve this part of the network. Thus, the solvability of a network depends on the way in which the NJ unknowns are distributed.

There do not seem to be any general rigorous rules for determining whether a network which includes all types of unknowns is, or is not, solvable. There is, however, one simple rule which follows immediately from the method of solution used, and is apparent from the examination of equation 14. Equation 14 has a unique solution for the NJ unknowns if and only if the rank of the matrix of coefficients is NJ. This will obviously

not be the case if any row of the matrix contains only zeroes. A row of zeroes would result if there were no unknowns appearing in the continuity equation of some node in the network. To avoid this, one has to distribute the unknowns throughout the network in such a way that there should be at least one unknown appearing in the continuity equation of each node. Considering any node, at least one of the following should be unknown:

(a) The consumption at the node

(b) The heads at the node itself or at adjacent nodes

(c) The resistance of a pipe which connects to the node

Observing this rule will eliminate the most common reason for making a network unsolvable. This does not imply, however, that a solution will be reached by the Newton-Raphson method.

To establish the criteria for convergence of the Newton-Raphson method for all possible combinations of unknowns appears to be impractical, if not impossible. For the case of a network in which the elements are only pipes and valves, and for which the unknowns are the heads at joints, Warga[10] has shown that the system of equations has a unique solution, and that this solution is reached by the Newton-Raphson method provided that a reasonable starting assumption is made. The conditions to which the characteristic functions of the elements must conform in order to fit Warga's analysis, are not fulfilled when the unknowns include pipe resistances, or when a pump is included in the network, and a solution is, therefore, not guaranteed. This theoretical difficulty is overcome in practice by starting the solution with a good initial guess. For example, one often has a fairly good knowledge of pipe resistances and if these are used as an initial guess, a solution is usually obtained.

If it is necessary to solve a network for a number of slightly different conditions, the amount of computation required may be greatly reduced by using the solution of one condition as the intial guess for a proceeding problem.

It is useful to understand some of the difficulties which may arise in the use of the Newton-Raphson method. Observe in Figure 1 that, for the one-dimensional case, if x' happens to be the present value of x, the procedure would fail to yield a finite improvement Δx because the tangent of f(x) at x' is parallel to the x-axis. Such singular points may exist in the multi-dimensional case as well, and would result in a matrix of derivatives in equation 14 with a rank smaller than NJ. (The computer program will print out a message to indicate that this condition has occurred). Another condition which may arise is an oscillating correction at one or more nodes. Here, the correction computed at the (k + 1)st iteration makes $x_{k+2} = x_k$, in other words--the path indicated in Figure 1 is a closed loop. This can be corrected by dividing the computed correction by 2. A check for oscillating unknowns is included in the computer programs, and each oscillating correction is divided by 2.

As the solvability of the network and the convergence of the Newton-Raphson method from an arbitrary starting point cannot be proven, one has to anticipate the possibility of getting a message from the computer program that a solution can not be reached. As described, this message results from a singular matrix of derivatives in equation 14. When the message is received a check is made to determine if there was a node for which the continuity equation includes no unknowns. If this was not the case, a check of guesses for starting values of the unknowns is then made. As outlined above,

for theoretical reasons it would be advisable to initially suspect assumed pipe resistances and heads near pumps as the cause of trouble. After developing some experience with the physical network subsequent trouble can be readily avoided. Invariably, a good initial guess will lead to the solution.

COMPARISON WITH THE HARDY-CROSS METHOD

The Hardy-Cross method is most commonly used for hand computations although many computer programs exist for its execution by digital computers. The physical law governing the solution of the network is either continuity at all nodes (as used by the method presented above and by the Hardy-Cross method of balancing heads) or continuity of the head line around each loop (as used by the Hardy-Cross method of balancing flows). The equations for all nodes (or loops) must be satisfied simultaneously for the network to be "balanced", or solved.

Both the Hardy-Cross and the present method solve these equations by iterations. The Hardy-Cross performs iterations on separate equations, one at a time, while the Newton-Raphson method iterates on the <u>set of equations simultaneously</u>. The Hardy-Cross method was developed to facilitate hand computations, and has the advantage of simplicity. The equation for each node (or loop) is formed and solved separately, independent of the other equations and has the advantage that the amount of information necessary to form each equation is small, as it relates only to a small section of the network. The simplicity of the method is of help in programming the method, but much more important is the small amount of storage required by it. Because each equation is formulated using data for only one node (or loop) secondary storage (e.g., disk) can be used to advantage with

only moderate increase in the time required to botain a solution.

The Hardy-Cross method suffers from a problem of solvability and convergence (Dillingham[7]). Various conditions, such as large pipe or very low flows, cause the iterative scheme to converge very slowly, or even diverge. Ad hoc procedures were developed (e.g., Dillingham[7]) to improve the convergence under some of these conditions, but there is no guarantee of convergence.

The general method of analysis developed in this work requires the formulation and solution of the entire set of network equations. The large active computer space requirement for these computations makes the maximum size of network which can be handled by this method on any given computer smaller than what can be handled by the Hardy-Cross method.

The advantages gained by the new method are great enough to outweigh this limitation for nearly all practical problems. The new method makes possible a direct solution for consumptions and resistances. It also makes the inclusion of elements other than pipes in the analysis a relatively simple and straight-forward matter. To compute a set of unknown heads at joints given all other information is a simple matter with a computer program using the Hardy Cross method, but with the same program, to adjust the assumed resistances to make the computed pressure map correspond to measured field data is a tedious trial and error procedure.

Some computer programs using the Hardy Cross method require the balancing of flows initially before starting the iterations. If many solutions of a large network are required this procedure can be excessively

time-consuming. The flexibility of the Newton-Raphson method imposes no such restriction as long as the intial guesses are within reason. In a real-time environment changes to fixed consumptions, heads, resistances or locations and types of unknowns can be made rapidly and conveniently. In network design applications the desirability of such flexibility is obvious. Moreover, for network monitoring or control, an area of increasing interest, flexibility is essential to compensate for temporary field sensor failures. When evaluating the two methods of analysis one has to weigh their relative capabilities against the price paid for achieving them.

SENSITIVITY ANALYSIS

The study of a water distribution system includes investigating the effect of changes in heads, flows and pipe resistances on the behaviour of the network. When many such variables are changed simultaneously, such as the changes in consumption at all nodes from one time of the day to another, a complete new solution of the network has to be obtained.

There are, however, situations in which one is interested in the sensitivity of the network to changes in a single variable. This situation arises when adjusting network data to make the solution conform to field measurements, and in evaluating proposed modifications or planning operating rules.

If a network solution is available a sensitivity analysis may be made without additional network solutions. The sensitivity analysis yeilds the rate of change of NJ selected variables with respect to changes in a single variable of interest. The same results may be used to evaluate the sensitivity of the variable of interest to changes in NJ other variables.

In a network with NJ nodes and NL pipes there are a total of (2NJ + NL) variables (NJ heads, NJ consumptions and NL resistances). The balanced network satisfies

$$F_j = 0 \qquad j = 1,\ldots,NJ \tag{22}$$

We are interested in derivatives of the form $\partial x_i/\partial y_k$, where x_i and and y_k can each be a head, consumption or pipe resistance. For the variable to be changed, y_k, we select a set, X, of NJ "free" variables which are allowed to change (X does <u>not</u> include y_k). The variables included in this set are denoted by x_i. Taking the derivative of equation 22 with respect to y_k, we get

$$\frac{dF_j}{dy_k} = 0 \qquad j = 1,\ldots,NJ \tag{23}$$

Expansion of equation 23 yields

$$\frac{\partial F_j}{\partial y_k} + \sum_{x_i \epsilon X} \frac{\partial F_j}{\partial x_i} \frac{\partial x_i}{\partial y_k} = 0 \qquad j = 1,\ldots,NJ \tag{24}$$

which may be written in matrix form

$$\left[\frac{\partial F_j}{\partial x_i}\right] \left\{\frac{\partial x_i}{\partial y_k}\right\} = \left\{- \frac{\partial F_j}{\partial y_k}\right\} \tag{25}$$

where [] denotes a matrix and {} a column vector. The set of NJ equations given by equation 25 includes NJ unknowns--the partial derivatives $\partial x_i/\partial y_k$.

The partial derivatives $\partial F_j/\partial y_k$ and $\partial F_j/\partial x_i$ are evaluated using data for the balanced network. The selection of the set of "free" variables, X, is subject to the same restrictions as the selection of unknowns for the network analysis.

The sensitivity analysis yields the approximate variations of x_i caused by a unit change in y_k, while all other $x \in X$ are allowed to change. The values are approximate as they are derivatives at a point, rather than finite changes. They provide, however, a convenient and rapid way of comparing the effects of all possible changes.

The two examples below illustrate the use of the sensitivity analysis using the sample network of Figure 2. Consider first the effect of a change in the resistance of pipe 5 on C_1 and H_2 thru H_5. Thus $y_k = R_5 = R_{35}$ and $X = (C_1, H_2, H_3, H_4, H_5)$, and equation 25 takes on the form

$$\begin{bmatrix} \frac{\partial F_1}{\partial C_1} & \frac{\partial F_1}{\partial H_2} & 0 & 0 & \frac{\partial F_1}{\partial H_5} \\ 0 & \frac{\partial F_2}{\partial H_2} & \frac{\partial F_2}{\partial H_3} & \frac{\partial F_2}{\partial H_4} & 0 \\ 0 & \frac{\partial F_3}{\partial H_2} & \frac{\partial F_3}{\partial H_3} & \frac{\partial F_3}{\partial H_4} & \frac{\partial F_3}{\partial H_5} \\ 0 & \frac{\partial F_4}{\partial H_2} & \frac{\partial F_4}{\partial H_3} & \frac{\partial F_4}{\partial H_4} & \frac{\partial F_4}{\partial H_5} \\ 0 & 0 & \frac{\partial F_5}{\partial H_3} & \frac{\partial F_5}{\partial H_4} & \frac{\partial F_5}{\partial H_5} \end{bmatrix} \begin{bmatrix} \frac{\partial C_1}{\partial R_5} \\ \frac{\partial H_2}{\partial R_5} \\ \frac{\partial H_3}{\partial R_5} \\ \frac{\partial H_4}{\partial R_5} \\ \frac{\partial H_5}{\partial R_5} \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ -\frac{\partial F_3}{\partial R_5} \\ 0 \\ -\frac{\partial F_5}{\partial R_5} \end{bmatrix} \qquad (26)$$

The expression for the derivatives are given in equations 11, 12, and

13. Equation 26 is solved directly for the derivatives of all heads with respect to R_5. These derivatives give the change in heads due to a unit increase in R_5. A negative value means the head will decrease when R_5 is increased. Implicit in this solution is the assumption that H_1, C_2 thru C_5 and all pipe resistances (except R_5 of course) remain unchanged when R_5 is changed.

In the next example consider the problem of trying to increase the head at node 3 (say for fire demand). We select $X = (R_2, R_3, R_5, C_2, C_4)$, assuming that these variables may be controlled independently (for example by closing valves in the pipes). For $y_k = H_3$ equation 25 takes on the form

$$\begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ \frac{\partial F_2}{\partial R_2} & 0 & 0 & \frac{\partial F_2}{\partial C_2} & 0 \\ \frac{\partial F_3}{\partial R_2} & \frac{\partial F_3}{\partial R_3} & \frac{\partial F_3}{\partial R_5} & 0 & 0 \\ 0 & \frac{\partial F_4}{\partial R_3} & 0 & 0 & \frac{\partial F_4}{\partial C_4} \\ 0 & 0 & \frac{\partial F_5}{\partial R_5} & 0 & 0 \end{bmatrix} \begin{bmatrix} \frac{\partial R_2}{\partial H_3} \\ \frac{\partial R_3}{\partial H_3} \\ \frac{\partial R_5}{\partial H_3} \\ \frac{\partial C_2}{\partial H_3} \\ \frac{\partial C_4}{\partial H_3} \end{bmatrix} = \begin{bmatrix} 0 \\ -\frac{\partial F_2}{\partial H_3} \\ -\frac{\partial F_3}{\partial H_3} \\ -\frac{\partial F_4}{\partial H_3} \\ -\frac{\partial F_5}{\partial H_3} \end{bmatrix} \qquad (27)$$

which is solved for $\partial x_i/\partial H_3$, $x_i \in X$. As we are interested in increasing H_3, we examine the derivatives $\partial H_3/\partial x_i$, given by the reciprocals of the solutions of equation 27. A large positive $\partial H_3/\partial R_i$ means that closing a valve in pipe i (increasing R_i) will be effective in increasing H_3. A large (in absolute magnitude) negative $\partial H_3/\partial C_i$ means that decreasing C_i will be

effective in increasing H_3.

IMPLEMENTATION ON A COMPUTER

Implementation of the method proceeded in parallel with development. The set of computer programs written for this study included input-output programs, data organization programs and analysis programs.

The input-output programs were required to minimize manual data handling. These programs were initially written for batch processing. When commercial time-sharing became available the system programs, which were provided as part of the time-sharing service, eliminated the need for most of the special input-output programs. The data files were originally structured according to the uses which were forseen. As the study progressed and new uses for the data arose it was necessary to develop data organization programs. These programs were used to temporarily restructure the data for specific uses.

Analysis programs were written to perform correlation and multiple regression analysis on the field data, to generate synthetic data for filling incomplete records, to solve the steady-state network problem, and to investigate the sensitivity of the network.

All programs were implemented on large high speed computers (e.g., IBM 7090 for batch processing or DEC PDP6 for time-sharing). Except for the network analysis program (SDP), all other programs required small core space (less than 10K) and running time of the order of one minute.

The SDP program required approximately 15K for a network of 70 nodes and 100 pipes. Running time per iteration is roughly proportional to $(NJ)^2$.

For a network with NJ = 35 and NL = 53 running time per iteration was approximately 6 seconds on a time-shared DEC PDP6. With NJ = 55 and NL = 80 running time per iteration was approximately 15 seconds on the same computer. These times include time spent on swapping in and out of core.

The number of iterations required to reach a solution with a given allowable error depends on the initial values of the unknowns. A maximum error of 0.01 cfs unbalanced discharge at any node was used throughout this study. With a good initial guess the solution is usually reached in 10 - 15 iterations. In a series of related runs, was in a 24-hour simulated network operation, one or two iterations were often sufficient to achieve convergence after the first run (each run used the solution of the previous run as a starting point).

The implementation of a general steady-state network analysis program involves the development of a considerable number of smaller programs. These programs are major engineering assets for the study of water distribution systems. They provide the engineer with powerful tools for managing extremely large sets of data and for testing a comprehensive variety of network configurations and loadings.

CONCLUSIONS

The following conclusions may be made:

1. A generalized method for solving a steady-state non-linear network has been developed.

2. The method requires a high-speed computer of large capacity for effective practical utilization. Such computers are now (1967) available commercially for on-line time-shared use or for batch processing.

3. The method's flexibility for handling changes in input data can be best utilized in a time-shared environment as an on-line tool to assist engineering design and decision making.

4. The method as implemented allows selection of unknown heads, consumptions or pipe resistances.

5. Problems without physical solutions may be specified by an inexperienced user because of the wide range of unknown types and locations which the method will handle. In order to have some assurance that a solvable network is specified it is convenient to specify that at least one of the following is unknown at each node:

(a) The consumption at the node

(b) The head at the node or at an adjacent node

(c) The resistance of a pipe connected to the node.

In practical use this rule is not usually inconvenient.

6. The method converges to a solution very rapidly if a good set of initial guesses is made for the values of the unknowns. If a set of solutions is desired for slightly different conditions it is advantageous to arrange the runs in a sequence which minimizes radical changes in system performance from run to run.

7. In some applications it may be desireable to incorporate a sensitivity analysis into the generalized method to avoid needless iteration to study slight variations from a particular solution. The sensitivity analysis appears to be of particular value for use in real time network operation by computer.

ACKNOWLEDGEMENTS

Much of the work described in this paper was performed as part of HUD project No. P-Mass.-3307 of the City of Boston. Data was furnished by agencies of the U.S. Government, the Commonwealth of Massachusetts and the City of Boston.

Suggestions by Dr. H. Paynter of M.I.T., in his capacity as consultant, wer instrumental in formulating methodology for modelling network behaviour. A field study by Robert Vitali, Hydraulic Engineer, under the general supervision of Charles Knoener, Eastern District Manager of Pitometer Associates, provided essential information for modelling and testing of models. Thesis work at M.I.T. was done under the supervision of Dr. R. T. McLaughlin.

Douglas A. Haith and David D. Moran, Hydraulic Engineers at Maguire Associates and William Schriek, now with the Saskatchewan Research Council did most of the computer programming and checking of results. The cooperation and assistance of the staff systems engineers at Applied Logic Corporation, Princeton, New Jersey, the General Electric Missiles and Space Division, and C.E.I.R. Inc. of Cambridge, Mass. is gratefully acknowledged.

Edward J. Pinkul, Division Engineer of the Boston Water Division and K. P. Devenis, Head of the Hydraulics Department of Maguire Associates in Boston contributed many suggestions regarding current waterworks practice.

APPENDIX: LIST OF SYMBOLS

C_j = consumption at node j (in cfs)

F_j = sum of the flows into node j (in cfs)

H_j = head at node j (in feet)

NJ = number of nodes in the network

NL = number of links (elements) in the network

Q_{ji} = discharge from node i to node j (in cfs)

R_{ij} = resistance of the element connecting node i with node j

R_k = resistance of element number k

```
      PROGRAM SDP
C     SDP
C     NETWORK ANALYZER PROGRAM
C     THIS VERSION GOOD FOR 125 PIPES, 79 NODES
C
 2009 FORMAT(10H  SOLUTION,I3,11H REACHED IN,I4,11H ITERATIONS,I5,
     113H OSCILLATIONS)
 7092 FORMAT(I4)
 2010 FORMAT(1H ,I4,2X,4I4,F9.1,2X,2F8.3,2X,A6,2X,F7.1,5X,A6,4X,F7.1)
 2011 FORMAT(93H  NODE  CONNECTING PIPE  ELEVATION  - CONSUMPTION - STAT
     1US  TOT  HEAD - STATUS  PRESSURE HEAD)
 1005 FORMAT(1X,9HITERATION,I4,28H  MAX. UNBALANCED DISCHARGE=,E14.6,7H
     1  NODE,I4)
 2012 FORMAT(1H ,11X,7HNUMBERS,6X,9HINVERT FT,4X,3HCFS,5X,3HMGD,4X,4HCON
     1S,4X,32HFT  H2O     HEAD   ELEVATION  FT,/)
 2013 FORMAT(2H  ,3(I4,2X),2X,F5.1,F10.1,4X,F6.1,5X,F8.4,5X,A6,2F8.3)
 2015 FORMAT(1H ,86H PIPE  FROM   TO   DIAMETER  LENGTH   HAZEN (C)   RE
     1SISTENCE - STATUS  -- DISCHARGE --)
 2016 FORMAT(1H ,8X,77HNODE  NODE   INCHES    FEET   COEFFICIENT  R=F(D,
     1L,C)    RES      CFS      MGD,/)
 2017 FORMAT(1H ,////)
 1000 FORMAT(3I4)
 1002 FORMAT(3F10.2)
 1003 FORMAT(I4,F10.4)
 1004 FORMAT(I4,2F10.2)
      COMMON NJ,A,CORR,IUK,NUK,LL,MON,J
      DIMENSION  A(79,80),CORR(79),H(79),CONS(79),ELEV(79),F(79)
      DIMENSION TABLEA(6),N(79,79),IUK(79),XSTAT(2),ICON(4)
      DIMENSION Q(79,79),D(125),AL(125),COMP1(79),COMP2(79),CHW(125)
      DIMENSION RMIN(79),RMAX(79),R(125)
      READ 4005,(TABLEA(I),I=1,6)
 4005 FORMAT(11A6)
C
C     READ DATA
C
    1 READ 1000,NJ,NL
      PRINT 1000,NJ,NL
      NUK=0
      NSOL=0
      NJP1=NJ+1
      IHOLD=0
C     INITIALIZE N(J,I)
      DO 10 J=1,NJ
      DO 10 I=1,NJ
   10 N(J,I)=0
C
C     INPUT UNITS (I3)   CFS=+1   MGD=+1
      READ 1003,IUNITS,ERQ
      PRINT 1003,IUNITS,ERQ
C
      READ 1000,NUP
C     READ KNOWNS FIRST AND ASSUMED UNKNOWNS SECOND
C     RESISTANCES AND PIPE PROPERTIES
      DO 20 II=1,NL
      READ 1000,J,I,NP
      PRINT 1000,J,I,NP
```

```
      N(J,I)=NP
      N(I,J)=N(J,I)
      READ 1002,AL(NP),D(NP),CHW(NP)
      PRINT 1002,AL(NP),D(NP),CHW(NP)
      R(NP)=850260.0*AL(NP)/((CHW(NP)**1.85)*(D(NP)**4.8/))
      IF(NL-NUP-II)15,20,20
   15 NUK=NUK+1
      RMIN(NP)=R(NP)*(CHW(NP)**1.85)/70.8
      RMAX(NP)=R(NP)*(CHW(NP)**1.85)/(160.0**1.85)
      IUK(NUK)=NP+3000
      PRINT 2008,NP,RMIN(NP),RMAX(NP)
 2008 FORMAT(1X,4HPIPE,I3,7H  RMIN=,E14.5,7H  RMAX=,E14.5)
   20 CONTINUE
C
C     NODE HEADS
      READ 1000,NUP
      DO 50 I=1,NJ
      READ 1003,J,HOLD
      PRINT 1003,J,HOLD
      H(J)=HOLD
      IF(NJ-NUP-I)40,50,50
   40 NUK=NUK+1
      IUK(NUK)=J+1000
   50 CONTINUE
C
C     NODE CONSUMPTIONS
      READ 1000,NUP
      DO 70 I=1,NJ
      READ 1003,J,HOLD
      PRINT 1003,J,HOLD
      IF(IUNITS)51,51,52
   52 CONS(J)=HOLD*1.55
      GO TO 53
   51 CONS(J)=HOLD
   53 IF(NJ-NUP-I)60,70,70
   60 NUK=NUK+1
      IUK(NUK)=J+2000
   70 CONTINUE
C
C     NODE ELEVATIONS - ALL ELEVS MUST BE KNOWN
      DO 80 M=1,NJ
      READ 1003,J,HOLD
      PRINT 1003,J,HOLD
      PRINT 9010,M,IUK(M)
 9010 FORMAT(1X,4HIUK(,I3,2H)=,I5)
   80 ELEV(J)=HOLD
C     SSOLV2
  243 CONTINUE
  210 DO 241 J=1,NJ
      COMP1(J)=0.0
      COMP2(J)=0.0
      DO 240 I=1,NJ
      Q(I,J)=0.0
  240 A(J,I)=0.0
  241 CONTINUE
 8055 CONTINUE
```

```
      NITER=0
C     TO CHANGE ALL C-COEF TO NEW VALUES, PUNCH NEW  COEF IN COLMN 4
C     OTHRWISE PUNCH 0 IN COLUMN 4
      READ 1002,COEF
      IF(COEF)7506,7506,7507
 7507 DO 7508 NP=1,NL
      CHW(NP)=COEF
 7508 R(NP)=850260.0*AL(NP)/((CHW(NP)**1.85)*(D(NP)**4.8/))
 7506 CONTINUE
      NOS=0
  250 NITER=NITER+1
      IF(NITER-100)251,9202,9202
  251 DO 300 J=1,NJ
      DO 300 I=1,NJ
      IF(N(J,I))300,300,280
  280 NP=N(I,J)
      Q(J,I)=(H(I)-H(J))/((R(NP)**0.54)*((ABSF(H(I)-H(J)))**0.46))
  290 Q(I,J)=-Q(J,I)
  300 CONTINUE
C     CALCULATION OF THE RIGHT HAND SIDE AND CHECK FOR MAX ERROR
      SMAX=0.0
      DO 320 J=1,NJ
      F(J)=CONS(J)
      DO 311 I=1,NJ
      IF(N(I,J))311,311,310
  310 F(J)=F(J)+Q(J,I)
  311 CONTINUE
      SUM=F(J)
      SUM=ABSF(SUM)
      IF(SMAX-SUM)992,320,320
  992 SMAX=SUM
      NODE=J
  320 CONTINUE
      PRINT 1005,NITER,SMAX,NODE
      IF(ERQ-ABSF(SMAX))990,990,590
  990 IF(NITER-10)9102,590,9102
 9102 CONTINUE
C     CALCULATION OF THE MATRIX A(K,L)
  991 DO 451 K=1,NJ
      J=K
      DO 450 L=1,NJ
      ITYPE=IUK(L)/1000
      GO TO (330,390,410),ITYPE
C
C     UNKNOWN HEADS
  330 I=IUK(L)-1000
      IF(I-J)340,360,340
  340 IF (N(J,I)) 450,450,350
  350 NP=N(J,I)
  353 A(K,L)=0.54/(((ABSF(H(I)-H(J)))**0.46)*(R(NP)**0.54))
      GO TO 450
  360 A(K,L)=0.0
      DO 380 I=1,NJ
      IF(N(J,I))380,380,370
  370 NP=N(J,I)
  373 DFDN = 0.54/(((ABSF(H(I)-H(J)))**0.46)*(R(NP)**0.54))
```

```
  374 A(K,L)=A(K,L)-DFDN
  380 CONTINUE
      GO TO 450
C
C     UNKNOWN CONSUMPTIONS
  390 I=IUK(L)-2000
      IF(I-J)450,400,450
  400 A(J,L)=1.0
      GO TO 450
C
C     UNKNOWN RESISTENCES
  410 NP=IUK(L)-3000
      DO 440 I=1,NJ
      IF(N(J,I))440,440,420
  420 IF(NP-N(J,I))440,430,440
  430 A(K,L)=-0.54*(H(I)-H(J))/((R(NP)**1.54)*((ABSF(H(I)-H(J)))**0.46))
  440 CONTINUE
  450 CONTINUE
  451 CONTINUE
C     ENTER RIGHT HAND SIDE IN A(K,NJP1)
      DO 460 J=1,NJ
  460 A(J,NJP1)=-F(J)
C
C     SOLVE FOR THE CORRECTIONS
      CALL USSE1
  510 DO 580 L=1,NJ
      IF(ABSF(CORR(L)-COMP1(L))-0.01)520,520,570
  520 NOS=NOS+1
  560 CORR(L)=CORR(L)/2.0
  570 COMP1(L)=COMP2(L)
  580 COMP2(L)=CORR(L)
      DO 585 L=1,NJ
      ITYPE=IUK(L)/1000
      GO TO (582,583,584),ITYPE
  582 LL=IUK(L)-1000
      H(LL)=H(LL)+CORR(L)
      GO TO 585
  583 LL=IUK(L)-2000
      CONS(LL)=CONS(LL)+CORR(L)
      GO TO 585
  584 LL=IUK(L)-3000
      R(LL)=R(LL)+CORR(L)
      IF(R(LL)-RMIN(LL))587,587,586
  586 IF(RMAX(LL)-R(LL))585,585,588
  587 R(LL)=RMIN(LL)
      GO TO 585
  588 R(LL)=RMAX(LL)
  585 CONTINUE
      GO TO 250
C
C
C     OUTPUT ROUTINE
C
C     SSOLV3
  590 PRINT 2017
      NSOL=NSOL+1
```

```
      PRINT 2009,NSOL,NITER,NOS
      PRINT 2011
      PRINT 2012
      DO 600 J=1,NJ
  591 CCFS=CONS(J)
      CMGD=CCFS/1.55
      DO 595 LL=1,4
  595 ICON(LL)=0
      LL=1
      DO 598 I=1,NJ
      IF(N(J,I))597,597,596
  596 ICON(LL)=N(J,I)
      LL=LL+1
  597 IF(4-LL)599,598,598
  598 CONTINUE
  599 PRES=H(J)-ELEV(J)
      DO 603 LX=1,2
      MON=LX
      LZ=1
      CALL SEARCH
      IF(MON) 603,603,602
  602 LZ=4
  603 XSTAT(LX)=TABLEA(LZ)
  600 PRINT 2010,J,ICON,ELEV(J),CCFS,CMGD,XSTAT(2),H(J),XSTAT(1),PRES
      PRINT 2017
      PRINT 2015
      PRINT 2016
  604 DO 640 J=1,NJ
      DO 605 I=J,NJ
      IF(N(J,I))605,605,606
  606 L=N(J,I)
      NP=L
      MON=3
      IF(100.0-R(NP))690,690,691
  690 R(NP)=99.9999
  691 CONTINUE
      LZ=1
      CALL SEARCH
      IF(MON) 613,613,612
  612 LZ=4
  613 XSTAT(1)=TABLEA(LZ)
      QA=Q(I,J)
      QC=Q(J,I)
      QB=QA/1.55
      QD=QC/1.55
  610 IF(Q(J,I))620,620,630
  620 PRINT 2013,NP,J,I,D(NP),AL(NP),CHW(NP),R(NP),XSTAT(1),QA,QB
      GO TO 605
  630 PRINT 2013,NP,I,J,D(NP),AL(NP),CHW(NP),R(NP),XSTAT(1),QC,QD
  605 CONTINUE
  640 CONTINUE
      PRINT 2017
      IF(ERQ-ABSF(SMAX))991,9202,9202
 9202 CONTINUE
C
C
```

```
C       BEGIN CHANGES IN FIXED HEADS,CONSUMPTIONS,RESISTANCES OR LOCATIONS
C       OF UNKNOWNS
C       FOR SOLVING SAME NETWORK WITH CHANGES PUNCH 0 IN COLUMN 4
C       FOR SOLVING NEW NETWORK PUNCH 1 IN COLUMN 4
        READ 1004,JCHNG
        IF(JCHNG-1)7093,1,7093
 7093   PRINT 7110
 7110   FORMAT(//////1X,31HCHANGES IN CONSUMPTION OR HEADS/)
        READ 1004,NN
        IF(NN-1)7100,7100,7502
 7502   DO 7500 I=1,NN
        READ 7097,KC,FLOW
        PRINT 7097,KC,FLOW
        IF(IUNITS-1)6666,6665,6666
 6665   FLOW=FLOW/0.646317
 6666   CONS(KC)=FLOW
 7097   FORMAT(I4,3F12.6)
 7500   CONTINUE
 7100   READ 7092,NN
        IF(NN-1)8055,8055,7504
 7504   DO 7099 I=1,NN
        READ 1004,J,HH
        PRINT 1004,J,HH
        H(J)=HH
 7099   CONTINUE
        GO TO 8055
        END
```

```
      SUBROUTINE USSE1
      COMMON NJ,DFDH,SOL,IUK,NUK,LL,MON,J
      DIMENSION DFDH(79,80),SOL(79),IUK(79),A(79,80)
 9415 FORMAT(24H USSE1 CANNOT SOLVE THIS)
      NJP1=NJ+1
      NSUB=0
  400 DO 401 J=1,NJ
      JPN=J+NSUB
      IF(NJ-JPN)402,403,403
  402 JPN=JPN-NJ
  403 DO 401 I=1,NJP1
  401 A(J,I)=DFDH(JPN,I)
      DO 404 J=1,NJ
      M=J+1
  405 AJJ=A(J,J)
      IF(ABSF(AJJ)-0.000001)406,407,407
  406 IF(NJ-M)409,408,408
  409 NSUB=NSUB+1
      IF(NJ-NSUB)414,400,400
  408 DO 410 I=1,NJP1
      DUMMY=A(J,I)
      A(J,I)=A(M,I)
  410 A(M,I)=DUMMY
      M=M+1
      GO TO 405
  407 DO 411 L=J,NJP1
  411 A(J,L)=A(J,L)/AJJ
      DO 404 NROW=1,NJ
      IF(NROW-J)412,404,412
  412 AB=A(NROW,J)
      DO 413 K=J,NJP1
  413 A(NROW,K)=A(NROW,K)-AB*A(J,K)
  404 CONTINUE
      GO TO 416
  414 PRINT 9415
  431 FORMAT(2X,E14.7)
      DO 419 JJ=1,NJP1
      DO 419 I=1,NJ
  419 PRINT 431,DFDH(I,JJ)
      CALL EXIT
  416 DO 417 J=1,NJ
      JMN=J-NSUB
      IF(JMN)420,420,417
  420 JMN=JMN+NJ
  417 SOL(J)=A(JMN,NJP1)
  418 RETURN
      END

      SUBROUTINE SEARCH
      COMMON NJ,A,CORR,IUK,NUK,LL,MON,J
      DIMENSION A(79,80),CORR(79),IUK(79)
      MON=J+(1000*MON)
      DO 902 LL=1,NUK
      IF(IUK(LL)-MON)902,905,902
  902 CONTINUE
      MON=0
      LL=NUK+1
  905 RETURN
      END
```

Boston Water

APPENDIX DN2

MEMORANDA

Charles A. Maguire & Associates

Boston Hartford Providence

FORM 61-1

Charles A. Maguire & Associates

Consulting Engineers

From: S. J. Madden

INTER-OFFICE MEMORANDUM

To: Files

Job No.: 639.0

Subject: Corrosion Analysis-Comparison of CIPRA Method with Hinchman Method.

Date: August 18, 1967

The two methods of corrosion analysis of cast iron pipe which have been demonstrated to Chas. A. Maguire & Associates are the Hinchman Co. method and The Cast Iron Pipe Association (CIPRA) method. Both methods evaluate corrosion from two points of view, electro-analysis and soil analysis.

With respect to electro-analysis, the processes differ as follows. The Hinchman Co. method requires contact with the pipe at a gate valve or other accessible fitting, plus contact with the earth at given intervals along the pipe. Pipe to soil potentials are taken, first directly over the pipe and second about 5' away from the pipe. No physical observation of the pipe is necessary. The CIPRA method requires excavation to the pipe. A potential is taken between the pipe and the soil adjacent to the pipe. This data can only be taken wehn and where excavations have been made.

For determination of soil resistivity, CIPRA recommends the use of a single probe which records resistivity of the soil adjacent to the exposed pipe. Hinchman Co., on the other hand, uses the Wenner Four-Pin method which is affected by variations in the soil moisture from the surface to the pipe.

With respect to soil analysis the method differ considerably. The CIPRA method investigates soil conditions at predetermined intervals by boring to the level of the pipe and obtaining soil samples. The samples are either field or laboratory analyzed for pH, salt content, oxidation reduction potential, soil type, etc. The Hinchman Co. utilizes excavation wherever available to determine pH.

In short, the Hinchman Co. specializes in electro-analysis using soil information where available. CIPRA, on the other hand, is concerned principally with soil evaluation and utilizes electro-analysis where possible. Information from either method must be interpreted in light of recorded history of breaks, observed corrosion, and previously collected date.

FORM 61-1

Charles A. Maguire & Associates

Consulting Engineers

From: S. J. Madden

INTER-OFFICE MEMORANDUM

To: Files

Job No.: 639.0

Subject: Demonstration: Aug. 8 - 9, 1967
Cast Iron Pipe Research Association
Corrosion analysis

Date: August 11, 1967

A corrosion analysis of in service cast iron pipe has been developed by the Cast Iron Pipe Research Association (CIPRA). The testing procedure was demonstraded on August 8, 1967, by Messrs. Warren Hunt and Robert Metz and again on Aug. 9, 1967 by Mr. Robert Metz. Lengths of water pipe were out of service for cement lining in the West Roxbury area. Access excavations were made at 500' intervals exposing short sections of the main for inspection. An excavation was made in the Copley Square area and the main was inspected.

The testing operation includes two analyses, chemical and electronic. The chemical examination is conducted on a representative sample of the soil adjacent to the pipe. Determinations run include, pH, moisture content, sulfates, and soil type. The electronic determinations include soil resistivity in ohm/c.c. and pipe to soil potential in milivolts. If a pipe to soil potential exists with a low resistivity soil corrosion will occur due to current passage depending on the above mentioned chemical variables. If there is no potential or if a potential exists in the presence of high resistance soil electrolytic corrosion will not be a problem although chemical corrosion may cause trouble. The pipe is then physically examined and the extent of corrosion compared with the test data.

The value of the method is not directly in the test results of a specific section of the system. The purpose of the process is to collect and record data through physical excavation of pits and examination of the pipe visually as well as analytically to determine the extent of corrosion and the variable contributing to corrosion. A continuous record of all conditions at the random examination pits as well as any data available on soil conditions and geology of the city is kept. With the information collected and built up, the extent of corrosion of any section of the city can be evaluated on the basis of testing alone without physical excavation and examination. The test data obtained by auger borings is simply compared with similar conditions and an evaluation of the corrosion can be inferred. The results of tests on a single reach of water main are not meaningful unless considered in the light of corrosion information found under similar conditions.

The procedure is quite thorough, examining as many variables as is possible. The main disadvantage of the method is the requirement for boring to the main since many areas of the city are underlain by very rocky soil, and the fact that electronic equipment is not useful in the presence of random D. C. currents.

SJM:jf

cc: K. P. Devenis
C. D. D. Howard
R. A. Barrows

FORM 61-1

Charles A. Maguire & Associates

Consulting Engineers

INTER-OFFICE MEMORANDUM

From: S. J. Madden

To: Files

Job No.: 639.0

Subject: Hinchman Company - Corrosion Analysis - August 4, 1967
Boston Water System

Date: August 11, 1967

A method of electronic evaluation of the extent of corrosion of cast iron pipe in service has been used extensively by the Hinchman Company, of Detroit Michigan. The method was demonstrated by John Fitzgerald, Vice President of Hinchman on August 4, 1967 in the West Roxbury area. Water mains in this area were out of service for cleaning and cement lining and were readily accessible for inspection.

This process offers a method of corrosion evaluation of pipe in service without physical excavation for visual inspection. Basically the equipment measures electrical activity on and in the vicinity of the pipe.

This activity can be used as an indicator of the surface corrosion (graphitization) of the pipe.

More specifically the procedure is as follows:

The first step is to select a reach of pipe with electrical access, i.e., an exposed hydrant gate valve for contact is ideal.

Contact is made with the gate and with the soil at some distance away to check electrical continuity of the pipe. Contact with the gate is held and voltage readings with the electrode are taken at arbitrary intervals, usually 25!.

Two readings are taken at each station; one over the main and one in the soil 3' or 4' away from the main. By comparing the voltage readings at each station a direction of current flow is established. Since magnitude of current flow is determined by resistance as well as voltage drop a measurement of soil resistivity is also taken. The data can be evaluated using Ohm's Law and the extent of graphitization is estimated from the electrical activity.

Three reaches of pipe were evaluated by this method. The first section had just been cement lined and a hydrant gate, tee and section of 12" main were exposed. A visual inspection of the condition of this pipe seemed to correlate with the evaluation of the electronic data, generally good condition with spot areas of higher corrosion. The second length of main was not exposed and therefore the analysis could not be spot-checked as above. The analysis was, however, reasonable judging by the known age of the main. Inspection of the third reach of pipe was more informative. Work pits (3) had been opened at 500' intervals. A short section of pipe was removed from each to allow access for cleaning and cement lining operations. One 500' length was examined electronically and an evaluation made. The pieces removed consisted of 2 nipples approximately 4' long and one bell ended offset. These sections were examined carefully using a sharp instrument. The electronic analysis was that the pipe was in generally excellent condition for its age (cast 1861). Some graphitization in spots but no severe corrosion. One reason for this lack of corrosion was extremely high soil resistivity. Visual inspection showed some pocket graphitization, and a little graphitization

around the ridges of the bell on the offset, but in general quite sound and serviceable pipe. It should be noted that all areas examined exhibited non-corrosive soil conditions. The method was not demonstrated in a high corrosion area.

The process has one main advantage. It gives an evaluation of corrosion conditions of a pipe in the ground, in service, without excavation. It also gives an idea of the location of weak areas which may become future breaks.

The process has certain disadvantages. One is coping with stray ground currents. The current flows from pipe to ground are of very small magnitude and therefore stray currents may introduce serious error. Random D. C. currents seriously interfere with the process. The presence of stray currents can be determined immediately before taking readings and therefore the engineer is aware of the condition and can use the process with discretion.

It should be realized that it is a subjective and not an objective test and therefore the results should be interpreted by an expert. It should also be realized that the process measures only electro-potential alone and cannot consider chemical conditions of the soil or groundwater, and the results should be considered in this light.

SFM:jf

cc: K. P. Devenis
C. D. D. Howard
R. A. Barrows

Boston Water

APPENDIX DN3

HINCHMAN COMPANY CORROSION REPORT

ABSTRACT: A preliminary corrosion survey was made in Boston to assess current techniques for predicting the in-situ structural condition of cast-iron pipes. The results indicate that current electronic methods require correlation with other data.

Charles A. Maguire & Associates

Boston Hartford Providence

CORROSION ENGINEERS Francis Palms Building • Detroit, Mich. 48201 • Telephone: 313-962-5272

THE HINCHMAN COMPANY

August 16, 1967

Mr. Charles D. Howard
Hydraulic Engineer
Charles A. Maguire & Associates
178 Tremont Street
Boston, Massachusetts 02111

Subject: Corrosion Survey, Boston Water Company
Our Job No. 767-1118 - Your Job No. 639.0

Dear Mr. Howard:

We have completed the brief corrosion survey of three lines in West Roxbury, Massachusetts. Six copies of the report are enclosed. One of these has been left unbound and was printed on plain paper in order that you may easily include it in the appendix to your report. The general corrosion information, found in the back of the bound copies, has been omitted from this copy per your request.

We found that the survey data correlated well with the visual examination. The pipes were found to be in generally good condition externally, and this was to be expected in view of the pipe-to-soil potentials and the soil resistivities measured. It is important to note, however, that this information is not necessarily indicative of piping elsewhere in Boston. Stray current, such as that often found around rapid transit systems, will cause severe corrosion even in very high resistivity soil. Consequently, complete corrosion studies need to be made in other areas in order to establish local conditions.

It is recommended that corrosion surveys be established as one factor in the evaluation of the reconditioning program. Where you desire excavations, for example, they can more realistically be located through a corrosion survey than by random sampling. Also, such surveys are valuable in planning new extensions. The report mentions several water companies that use corrosion surveys as standard practice.

Please extend our appreciation to Mr. Pinkul for his assistance and cooperation while Mr. Fitzgerald was on the job. We have enjoyed working with you on this project and look forward to continued association. If you have any questions, please do not hesitate to call.

Yours very truly,

Lewis H. West, P.E., President

LHW:dkn
Enclosures

Report of External Corrosion Survey
Cast Iron Water Mains
Temple, Constance and Spring Streets
West Roxbury, Massachusetts
(Boston Water Company)

Prepared For
Charles A. Maguire & Associates
178 Tremont Street
Boston, Massachusetts 02111

Our Job No. 767-1118
Your Job No. 639.0
August 16, 1967

John H. Fitzgerald, III, P.E.
Project Manager

Lewis H. West, P.E.
President

The Hinchman Company
Engineers
1104 Francis Pulms Building
Detroit, Michigan 48201

TABLE OF CONTENTS

Section	Description	Page
I.	INTRODUCTION	1
II.	RECOMMENDATIONS	1-2
A.	Lines Tested	1
B.	Use of Corrosion Surveys	1
III.	CONCLUSIONS	2
A.	Lines Tested	2
B.	Use of Corrosion Surveys	2
IV.	TESTS AND EVALUATIONS	3-6
A.	Soil Resistivity	3
B.	Pipe-to-Soil Potential Measurements	3
C.	Visual Examinations	5
V.	OTHER EVALUATIONS	6-7

Report of External Corrosion Survey
Cast Iron Water Mains
Temple, Constance and Spring Streets
West Roxbury, Massachusetts
(Boston Water Company)

I. INTRODUCTION

A corrosion survey was conducted on cast iron lines in Temple, Constance and Spring Streets, West Roxbury, Massachusetts on August 4, 1967. The purpose was to evaluate the use of corrosion data in the reconditioning program of the Boston Water Company.

The lines tested were found to be in good condition. Soil resistivity was high, above 25,000 ohm centimeter, and appreciable corrosion of cast iron rarely occurs in this type of soil, particularly in such non-stray current areas. Survey data correlated well with visual inspection of the lines tested. The results, however, must not be considered as representative of pipe throughout Boston; and additional tests need to be made elsewhere to determine local conditions. The presence of stray current, for example, will cause severe corrosion in otherwise relatively non-aggressive soils.

We recommend that corrosion surveys be included among the factors necessary to determine the condition of existing pipelines. The data, along with the break history in the area, can be evaluated to formulate the proper course of action. Where excavations are desired, they can be located much more meaningfully by a corrosion survey than by random sampling and, thus, more reliable information can be obtained. Corrosion surveys should also be made along the routes of proposed pipelines. From the data gathered, corrosion control measures, prudent choice of materials, etc. can be determined. Several modern water companies in this country use corrosion surveys as standard procedures, and we recommend that such surveys be established in Boston.

II. RECOMMENDATIONS

A. Lines Tested

These lines were found to be in good condition and cleaning and lining should be continued. No external corrosion control measures are recommended.

B. Use of Corrosion Surveys

1. Reconditioning Program

Pipe-to-soil potentials, soil resistivity, soil pH and stray current studies should be included along with pressure drops and other tests to determine the condition of existing pipe. Excavations, already necessary to examine pipe interior and for cleaning and lining operations, should be located from

pipe-to-soil potential data rather than at random in order that the worst (or best) exterior pipe condition may be seen. The break history should also be studied to see if typical corrosion patterns are evident. All water main breaks should be evaluated to determine if graphitization is present. While the actual break may be due to a physical stress, the cause is really corrosion when graphitization (a corrosion phenomenon) has weakened the pipe.

Water treatment should be considered for control of interior corrosion. The economics of this versus cement lining should be explored.

2. Pipeline Extensions

A corrosion survey should be run along the route of proposed new mains. Soil resistivity and pH, stray current information and a general study of experiences in similar areas should be included. From such a survey, necessary corrosion control can be developed. The steps taken may include cathodic protection, coating, stray current bonds, and use of alternate materials such as concrete, asbestos cement or steel. The choice of material should be based on a total economic study, one factor of which should be corrosion control.

III. CONCLUSIONS

A. Lines Tested

These lines were found to be in good condition. Electrical tests correlated well with the results of visual inspections. Soil resistivity is high (well above 25,000 ohm centimeters) and appreciable corrosion of cast iron is not to be expected in this area. No breaks have been reported on these lines. Except for a slight amount on Temple Street, no stray current was found.

Only a small area was tested. Additional testing is necessary to determine conditions in other locations throughout Boston. It should not be concluded that cast iron pipe will give indefinite service anywhere or that no present lines need be replaced rather than simply cleaned and lined. Soil resistivity, stray current and other factors vary throughout Boston and each area needs to be individually evaluated.

B. Use of Corrosion Surveys

Corrosion surveys are a useful tool in both reconditioning and extension programs. Such surveys are an important factor in determining pipe conditions and the data obtained can be used in conjunction with other information to determine the proper course of action. Corrosion surveys are standard practice in many water companies; San Diego, California, San Antonio, Texas and Philadelphia, Pennsylvania to name a few.

IV. TESTS AND EVALUATIONS

A. Soil Resistivity

Soil resistivity measurements were made using the Wenner four pin method. Locations tested and results obtained appear in Table I.

TABLE I

Soil Resistivity
Ohm Centimeters

Location	Average To 5' Depth	Average To 10' Depth
Temple Street at Railroad Bridge	97,500	53,750
Constance Road south of Baker Street	47,000	36,300
Spring Street at Walnut Street	33,500	28,700
Spring Street at Gould Street	115,000	72,500
Spring Street at VFW Pky. (very dry here)	545,000	362,000

These soils are classified as very high resistivity and are normally non-corrosive to cast iron. Differences in resistivity along a pipeline also cause corrosion, with corrosion occurring in the area of lower resistivity. Note that on Spring Street the resistivity increases southbound toward VFW Parkway. In these soils, however, only minor corrosion of cast iron is to be expected despite the differentials observed. In general, corrosion of cast iron becomes significant only in soils below 5,000 ohm cm.

B. Pipe-to-Soil Potential Measurements

These measurements were obtained using a copper-copper sulfate half-cell and a potentiometer/voltmeter. Contact to the earth beneath the paving was effected by drilling a hole through the pavement. Corrosion is indicated by the specific values of the data and by over-the-pipe readings that are higher (more negative) than remote readings. Extensive graphitization is revealed by very low readings (0.2 volts, e.g.).

To make these tests over a length of pipeline, it is essential that the pipeline be electrically continuous. With cast iron pipe, slip and mechanical joints are generally not continuous whereas poured lead joints usually are. The pipe involved in this study was all lead joint and tests confirmed that electrical continuity existed.

The following data were obtained:

1. Temple Street at Railroad (12-inch line)

Pipe-to-Soil Potential
Volts Negative to $CuSO_4$

		Over Pipe	5' Remote	Remarks
Hydrant w/o RR		.550	.540	Fluctuations of ± .005 indicate stray current.
	25'	.640	.620	
	50'	.600	.570	
	100'	.620	.620	
E	125'	.540	.570	
	150'	.630	.590	
	175'	.630	.640	
	200'	.620	.640	

No extensive graphitization is indicated, but several points of active corrosion are evident. In view of the high soil resistivity, potential differences observed indicate relatively minor corrosion.

2. Constance Road, South of Baker (8-inch line)

Pipe-to-Soil Potential
Volts Negative to $CuSO_4$

		Over Pipe	5' Remote
Hydrant at 142 Constance		.580	.480
	25'	.580	.500
	50'	.630	.580
	75'	.580	.540
	100'	.580	.570
N	125'	.610	.570
	150'	.640	.620
	175'	.550	.600

Over-all corrosion is evident here. With corrosion thus spread out over the pipe surface, no severe attack is indicated. Extensive graphitization also is not revealed.

3. Spring Street between Gould Street and VFW Parkway (12-inch line)

Pipe-to-Soil Potential
Volts Negative to $CuSO_4$

		Over Pipe	5' Remote	
Gate, NE corner Gould		.610	.540	
S ↓	25'	.540	.530	
	45'	.480	.510	
	55'	.510	.530	At Excavation
Hydrant n/o VFW Parkway		.610	.560	
S ↓	25'	.610	.570	
	35'	.520	.630	Excavation
	50'	.610	.560	Gate, cor. VFW Pky.

Here again, no severe graphitization is indicated. Corrosion is fairly well spread over the pipe surface with the pipe at the excavations being the least affected.

C. Visual Examinations

1. Temple Street

Three feet of pipe were examined at the hydrant west of the railroad and found to be free of any appreciable corrosion. One area, 2" x 2" of surface graphitization, was found. The pipe is about 30 years old.

2. Constance Road

No inspection was made. Should a future examination be desired, excavations should be made at points 50' and 150' north of the hydrant at 142 Constance. These points represent the most active corrosion. The pipe is about 30 years old.

3. Spring Street (Pipe about 70 years old)

a. Between Walnut and Moreland Street.

Two removed sections were examined and found to be in good condition. Graphitization to a depth of 1/16" was found over about 5% of the surface; otherwise only general corrosion had occurred with very thin surface graphitization evident. Inside, there was 100% turburculation with graphitized areas up to 1/8" deep under the tuburcules.

b. Gould Street

A five foot removed section was examined. Again, about 5% of the surface exhibited graphitization to a depth of 1/16" with the remainder of the surface in good condition. Graphitization up to 1/4" deep was found under the interior tuburcules.

c. VFW Parkway

The excavation here was not completed during our tests. The pipe is expected to be in excellent condition, however, based on the electrical tests.

V. OTHER EVALUATIONS

When cast iron pipe corrodes, the ferritic portion is lost and the carbon or graphite, along with products of corrosion, remain behind. Such "graphitized" pipe, while retaining the appearance of the original structure, lacks strength. If, however, it is not subjected to excessive internal or external stresses, graphitized pipe may give indefinite service. Main breaks usually occur at places where the pipe wall has been weakened by corrosion. Typical of these failures are circumferential breaks where the entire wall has graphitized and large holes in the pipe where plugs of graphite have developed. These types of graphitization usually occur in soils below 5000 ohm centimeter resistivity. Actual pitting and evident corrosion of cast iron generally occurs only in soils below 1000 ohm cm. Above 5000 ohm cm, surface graphitization generally takes place and severe corrosion is seldom found. Of course, the presence of stray current, such as from the MBTA transit lines, will alter this pattern and may cause severe corrosion in high resistivity areas.

Experience has shown that once corrosion failures begin, they increase logarithmically with time. The same is true of cast iron main breaks when they are due to corrosion. If main breaks, when plotted on semi-logarithmic paper, exhibit a straight line, then the true cause of the majority of the breaks is corrosion. When making these plots, it is important to choose areas in which all the pipe is about the same age.

Corrosion surveys can be very useful in reconditioning programs as well as for future extensions. Knowledge of soil resistivity and the presence of stray current will indicate if appreciable corrosion of cast iron is probable.

Pipe-to-soil potential measurements are helpful in determining the exterior condition of existing pipelines.

Locations for bell hole examination of the pipe surface can be chosen by using potential measurements to find the worst areas. This leads to more accurate results than can be obtained from random selection of excavation sites. In areas of non-electrically continuous joints (mechanical or slip joints, e.g.), detailed tests cannot economically be made. General conditions may be determined, however, from spot tests at hydrants or valves.

Finally, by combining the electrical tests with a study of the break history of the line in question, the over-all corrosion situation can be determined.

Thus, corrosion surveys become one of the factors necessary to evaluate the future performance of existing lines. The survey, when combined with pressure drop tests and visual inspection of the interior and exterior of the pipe, will give a reliable picture of the piping condition.

For pipeline extensions, soil resistivity, soil pH, presence of stray current and knowledge of the behavior of existing pipes in similar areas will dictate the corrosion prevention necessary. Among the items to be considered are coating, cathodic protection, joint bonds and use of non-metallic pipe. Note that cement type piping is not limitless in its use either, and generally is not recommended in soils below pH 4.0. In high sulfate soils, sulfate resistant cement is necessary.

Boston Water

APPENDIX DN4

CAST IRON PIPE RESEARCH ASSOCIATES REPORT

ABSTRACT: A preliminary corrosion survey was made including measurement of soil chemical properties and the use of electronic methods. The suggestion is made that continuing corrosion surveys as part of normal Water Divison operation would be desirable.

Charles A. Maguire & Associates

Boston Hartford Providence

REPORT ON OBSERVATIONS OF CAST IRON WATER MAINS

BOSTON, MASSACHUSETTS

WATER DIVISION

AUGUST 7-8, 1967

FOR

Charles A. Maguire and Associates

178 Tremont Street

Boston, Massachusetts

"REPORT ON OBSERVATIONS OF CAST IRON WATER MAINS"

BOSTON, MASSACHUSETTS

August 7-8, 1967

At the request of Charles A. Maguire and Associates, a limited number of observations were made with regard to cast iron pipe serving the Boston Water District. The field investigation was completed by Research Engineer, J. Robert Metz and Regional Engineer, Warren J. Hunt, both of Cast Iron Pipe Research Association. In order to demonstrate the procedures followed by Cast Iron Pipe Research Association in evaluation of pipe and environment, observations were made at a few locations. The results of these observations are listed on the following pages.

In addition, typical water analyses were reviewed. From the results furnished, it is concluded that water to which this system is exposed is extremely aggressive. It is expected that cast iron water mains with ordinary shop coating would be severely tuberculated upon extended exposure to the water.

Electrical potential readings at locations 1,3 and at Copely Square did not indicate evidence of stray direct current at the first two, but did indicate the possibility of stray current at Copely Square. This should be further investigated.

RECOMMENDATIONS:

The following recommendations are intended to help in evaluation of cast iron pipe in the Boston water system, and in assuring continued good results in the operation of the system.

1. Personnel should be trained to investigate soils and interpret soil characteristics in the Boston system. The Cast Iron Pipe Research Association offers assistance in training engineers in this work and in direct assistance in special problems.

2. It is recommended that a continuing study of pipe failure frequency, cause of failure and environmental characteristics be made.

3. Corrective water treatment to reduce aggressiveness should be subjected to further study.

This report was abstracted from the report of the CIPRA submitted to Charles A. Maguire and Associates by W. Harry Smith, P.E., Assistant Managing Director, on August 25, 1967.

LOCATION NO. 1

Temple Street in West Ro x bury

EARTH RESISTIVITY ..... 70,950 ohms-Cm^3
(single probe)

EARTH RESISTIVITY ..... 15,600 ohms-Cm^3
(water saturated)

OXIDATION-REDUCTION..... + 234 mv.
POTENTIAL

pH 8.1

SULFIDES ..... Negative

SOIL DESCRIPTION ..... Brown, very rocky. Moist sand.

PIPE CONDITION ..... Generally sound, no pits.

LOCATION NO. 2

Spring Street at Moreland, West Ro x bury

EARTH RESISTIVITY ..... 1,600 ohms-Cm^3
(single probe)

EARTH RESISTIVITY ..... 800 ohms-Cm^3
(water saturated)

OXIDATION-REDUCTION..... + 186 mv.
POTENTIAL

pH 6.3

SULFIDES ..... Positive

SOIL DESCRIPTION ..... Blk. sandy soil with decayed wood

PIPE CONDITION ..... Few scattered shallow pits, one .091 inches deep, .625 inches in diameter, pipe manufactured 1878.

LOCATION NO. 3

Spring Street at Gould, West Roxbury

EARTH RESISTIVITY ..... 10,000 ohms-Cm^3
(water saturated)

OXIDATION-REDUCTION..... + 156 mv.
POTENTIAL

pH 7.3

SULFIDES ..... Trace

SOIL DESCRIPTION ..... Gray brown clay, plastic, saturated.

PIPE ..... Class "B" - 1878.

LOCATION NO. 4

View Parkway 500 Ft. E. of Rotory

EARTH RESISTIVITY ..... 15,800 ohms-Cm^3
(water saturated)

OXIDATION-REDUCTION .... + 186 mv.
POTENTIAL

pH 7.2

SULFIDES ..... Negative

SOIL DESCRIPTION ..... Brown to gray clay with some rock.

The above observations revealed potentially corrosive soil at location No. 2. This was confirmed by the pitting observed in a four foot section. There was an indication of contamination of the soil. At the other locations, the soil was generally free from corrosive tendencies which would affect cast iron or ductile iron pipe.

Boston Water

APPENDIX DN5

PARTIAL BIBLIOGRAPHY

ABSTRACT: Some of the reference material consulted during the Boston Water Study is presented. Standard reference books are omitted.

Charles A. Maguire & Associates

Boston Hartford Providence

PARTIAL BIBLIOGRAPHY

1. Appendix "Report on Comprehensive Water System Study", Black & Veatch, Kansas City, Missouri (for the Board of Water Commissioners, City and County of Denver, Colorado), 1963.

2. Appleyard, V. A., "Automation Developments in Philadelphia", Journal American Water Works Association (January 1958).

3. Baxter, S. S. and Appleyard, V. A., "Centralized Load and Quality Control Systems at Philadelphia", Journal American Water Works Association (October 1962).

4. Baxter, S. S., "Management Reorganization of Philadelphia Water Department", Journal American Water Works Association, Vol. 48, No. 10 (October 1956).

5. Baxter, S. S. and Radziul, J., "Use of Computers in Water Utility Work at Philadelphia", presented at American Water Works Association Annual Conference, Bal Harbour, Florida (1966).

6. "Boston Redevelopment Authority Report on Preliminary Studies of Existing Utility Systems", Charles A. Maguire & Associates, Boston, Mass. (1964).

7. "Boston Redevelopment Authority Report on Water & Sewage Systems Inspection and Flow Measurement" - South End Project - Mass. R 56, Charles A. Maguire & Associates, Boston (1964).

8. Braxton, J. S., "Problem in Multi-Story Building Design, Water Pressure Boosting Systems", Consulting Engineer Magazine (May 1965).

9. Brock, D. A., "Determination of Optimum Storage in Distribution System Design", Journal American Water Works Association, Vol. 55, No. 8 (August 1963).

10. Brown, Jr., G. and McGuire, C. B., "A Socially Optimum Pricing Policy for a Public Water Agency", Water Resources Research, Vol. 3, No. 1 (First Quarter 1967).

11. Burgess, W. T., "Cathodic Protection for the Waterworks", presented at Northeast Regional Conference, National Association of Corrosion Engineers, Boston, Mass. (1966).

12. Camp, T. R., "Water Distribution", Handbook of Applied Hydraulics, Section 20, McGraw-Hill, New York, N. Y. (1952).

PARTIAL BIBLIOGRAPHY (Continued)

13. "City of Philadelphia Water Department Annual Report 1965", Philadelphia Water Department, Philadelphia, Pennsylvania (1965).

14. Cole, E. Shaw, "Discussion - Report on Loss in Carrying Capacity of Water Mains", Journal American Water Works Association, Vol. 48, No. 1 (January 1956).

15. Cole, Edward S. and Cole, E. Shaw, "Pitot Tubes in Large Pipes", Transactions of The American Society of Mechanical Engineers (August 1939).

16. Cole, Edward S., "Pitot-Tube Practice", Transactions of The American Society of Mechanical Engineers (Hyd-57-9).

17. Cole, E. Shaw, "Present Day Scope of Pitometer Surveys", Journal American Water Works Association (February 1945).

18. Design Manual - Civil Engineering, Department of the Navy, Bureau of Yards and Cocks (NAVDOCKS DM-5), Washington, D. C.

19. Dillingham, J. A., "Computer Analysis of Water Distribution Systems", Part 2, Water & Sewage Works Magazine (February 1967).

20. Durfur, C. N. and Becker, E., "Public Water Supplies of the 100 Largest Cities in the United States", U. S. Geological Survey, Water Supply Paper 1812 5 (1964).

21. Fiering, M. B. and Hufschmidt, M., "Simulation Techniques for Design of Water Resource Systems", Harvard University (1966).

22. Flack, J. E. and Martinez-F, F., "Urban Water Use Study", presented at American Society of Civil Engineers Water Resources Engineering Conference, Denver, Colorado (1966).

23. Greaser, H., "The Use of Computers in Water Utility Work at Dallas", presented at American Water Works Association Annual Conference, Bal Harbour, Florida (May 1966).

24. Honn, Jr., R. W., "Digital Computers, A Promising Tool for Water Utilities", presented at 86th Annual Conference American Water Works Association.

25. "Housing Market Potential of New Orleans, Louisiana 1965-1975", W. R. Smolkin and Associates, Inc., New Orleans, Louisiana.

PARTIAL BIBLIOGRAPHY (Continued)

26. Howe, C. W. and Linaweaver, Jr., F. P., "The Impact of Price on Residential Water Demand and Its Relation to System Design and Price Structure", Water Resources Research, Vol. 3, No. 1 (First Quarter 1967).

27. Hubbard, C. W., "Investigation of Errors of Pitot Tubes", Transactions of The American Society of Mechanical Engineers (August 1939).

28. Hudson, W. D., "Loss of Water Main Capacity", Journal Southeastern Section American Water Works Association, Vol. 30, No. 1 (April 1966).

29. Kerr, S. L., "Research Investigation of Current-Meter Behavior in Flowing Water", Transactions of The American Society of Mechanical Engineers (Hyd-57-9).

30. Kiewit, J. L., "Protective Linings for the Water Passage Surfaces of Ferrous Metalwork", Denver Federal Center, Denver, Colorado.

31. "Legislative Research Council Report Relative to Water Shortage and Industrial Water Use and Reuse", The Commonwealth of Massachusetts (1966).

32. Lischer, V. C., "Water Needs in 1999", presented at American Society of Civil Engineers Water Resources Engineering Conference, Denver, Colorado (1966).

33. Martin, D. W. and Peters, G., "The Application of Newton's Method To Network Analysis by Digital Computer", Journal of the Institute of Water Engineers, Vol. 17 (1963).

34. McIlroy, M. S., "Water Distribution Systems Studied by a Complete Electrical Analogy", Journal New England Water Works Association, Vol. LXV, No. 4 (November 1950).

35. McPherson, M. B., "Applications of System Analyzers", Water & Sewage Works Magazine - Reference Number (1962).

36. McPherson, M. B., "Ground Storage Booster Pumping Hydraulics", Journal American Water Works Association (March 1966).

37. McWhinnie, R. C., "Distribution System Planning for Metropolitan Denver", American Society of Civil Engineers Resources Engineering Conference, Denver, Colorado (1966).

38. Nagler, F. A., "Use of Current Meters for Precise Measurement of Flow", Transactions of The American Society of Mechanical Engineers (Hyd-57-1).

PARTIAL BIBLIOGRAPHY (Continued)

39. Namias, J., "Abstract of Nature and Possible Causes of Fluctuations in U. S. Climactic Pattern over the Past Four Years", Environmental Science Service Administration, Washington, D. C.

40. Ott, L. A., "Observations on the Use of Current Meters for Precise Flow Measurement", Transactions of The American Society of Mechanical Engineers (Hyd-57-6).

41. Radziul, J. V. and Campbell, S. J. and Flentje, M. E., "New Developments in Deposition of Calcite Linings in Small-Diameter Pipe", Journal American Water Works Association, Vol. 57, No. 10 (October 1965).

42. Radziul, J. V. and Jackson, R. E., "Cleaning and Lining of Small Pipe at Philadelphia", Journal American Water Works Association, Vol. 57, No. 12 (December 1965).

43. "Report - Capital Development Program", Board of Water Commissioners, City and County of Denver, Colorado (January 1966).

44. "Report on Comprehensive Water System Study", Black & Veatch, Kansas City, Missouri, for Board of Water Commissioners, City and County of Denver, Colorado (1963).

45. "Report on Pitometer Water Waste Survey, Area No. 2, Boston, Massachusetts", The Pitometer Associates, New York, N. Y. (1966).

46. "Report on Pitometer Water Waste Survey, Area No. 3, Boston, Massachusetts", The Pitometer Associates, New York, N. Y. (1964).

47. "Report on Pitometer Water Waste Survey" Section No. 2, Denver, Colorado, The Pitometer Associates, New York, N. Y. (1955).

48. "Report on Trunk Main Survey, Boston, Massachusetts" for Charles A. Maguire & Associates, The Pitometer Associates, New York, N. Y. (1966).

49. "Report on Trunk Main Survey, Denver, Colorado", The Pitometer Associates, New York, N. Y. (1962).

50. "Report on Water Supply and Distribution for South Burlington, Vermont", Charles A. Maguire & Associates, Boston, Massachusetts (1961).

51. Root, D. A. and Camp, T. A., "Determination of Charges for Public Fire Protection", Journal New England Water Works Association (1955).

PARTIAL BIBLIOGRAPHY (Continued)

52. Sheaffer, J. R. and Zeizel, A. J., "The Water Resource in Northeastern Illinois: Planning Its Use", Technical Report, No. 4, Northeastern Illinois Metropolitan Area Planning Commission (1966).

53. "Summary 1965/1975 General Plan for the City of Boston and The Regional Core", Boston Redevelopment Authority (1965).

54. Thomashov, N. D., "Theory of Corrosion and Protection of Metals, The Science of Corrosion", The Macmillan Co., New York (1966).

55. Warmwell, F. and Booth, G. H., "Bacterial Corrosion of Pipe Lines", Corrosion Tech., Vol. 11, No. 4 (April 1964).

56. Wost, L. H., "Don't Let Corrosion Waste Clients' $", Consulting Engineer Magazine (March 1965).

57. Winslow, F., "Chronological Table of Boston Water Works", City of Boston, Massachusetts (1956).

Boston Water

APPENDIX SLS

COMPUTOR ANALYSIS

Charles A. Maguire & Associates

Boston Hartford Providence

TABLE - SLS1

01:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	14.343	9.253		167.0	KNOWN	152.0
2	81	6	7	0	20.0	24.709	15.941	KNOWN	166.8		146.8
3	81	8	0	0	20.0	4.611	2.975	KNOWN	166.8		146.8
4	9	0	0	0	20.0	10.908	7.037	KNOWN	166.4		146.4
5	8	9	80	10	40.0	-0.975	-0.629	KNOWN	166.3		126.3
6	2	6	1	3	10.0	-4.796	-3.094	KNOWN	166.1		156.1
7	1	0	0	0	45.0	0.232	0.150	KNOWN	166.7		121.7
8	3	16	47	0	10.0	-1.594	-1.028	KNOWN	165.3		155.3
9	16	5	15	46	10.0	-1.671	-1.078	KNOWN	165.3		155.3
10	4	5	14	0	10.0	-0.712	-0.459	KNOWN	165.7		155.7
11	15	14	13	28	10.0	-1.934	-1.248	KNOWN	165.0		155.0
12	7	80	13	11	20.0	-1.826	-1.178	KNOWN	166.3		146.3
13	11	12	17	0	20.0	-1.717	-1.108	KNOWN	166.0		146.0
14	10	12	18	0	35.0	-0.712	-0.459	KNOWN	166.1		131.1
15	18	19	73	0	35.0	-1.207	-0.779	KNOWN	163.0		128.0
16	28	17	75	26	15.0	-1.253	-0.809	KNOWN	165.1		150.1
17	19	75	74	0	15.0	-0.866	-0.559	KNOWN	164.4		149.4
18	47	45	49	48	20.0	-1.532	-0.988	KNOWN	164.8		144.8
19	74	20	24	25	15.0	-0.464	-0.299	KNOWN	163.9		148.9
20	73	20	21	0	30.0	-1.717	-1.108	KNOWN	162.3		132.3
21	21	23	22	0	40.0	-1.826	-1.178	KNOWN	159.5		119.5
22	30	29	44	0	10.0	-2.383	-1.537	KNOWN	164.9		154.9
23	24	23	33	34	10.0	-1.145	-0.739	KNOWN	160.5		150.5
24	43	65	64	52	15.0	-0.309	-0.200	KNOWN	162.1		147.1
25	30	43	76	0	10.0	-0.387	-0.250	KNOWN	162.9		152.9
26	42	31	32	0	15.0	-1.083	-0.699	KNOWN	161.0		146.0
27	42	78	77	0	10.0	-0.186	-0.120	KNOWN	161.0		151.0
28	78	66	67	0	10.0	-0.279	-0.180	KNOWN	161.1		151.1
29	65	66	63	71	15.0	-0.309	-0.200	KNOWN	161.7		146.7
30	76	31	82	0	10.0	-0.634	-0.409	KNOWN	162.2		152.2
31	25	82	27	0	10.0	-0.464	-0.299	KNOWN	163.9		153.9
32	26	29	27	0	10.0	-1.377	-0.888	KNOWN	165.0		155.0
33	64	63	62	0	20.0	-1.269	-0.819	KNOWN	161.9		141.9
34	62	60	61	0	20.0	-0.789	-0.509	KNOWN	162.1		142.1
35	71	60	59	0	10.0	-0.789	-0.509	KNOWN	161.8		151.8
36	59	58	57	0	10.0	-0.789	-0.509	KNOWN	162.1		152.1
37	61	58	56	0	15.0	-1.160	-0.749	KNOWN	162.4		147.4
38	56	55	53	0	15.0	-0.789	-0.509	KNOWN	162.7		147.7
39	57	55	54	0	15.0	-0.789	-0.509	KNOWN	162.7		147.7
40	52	53	51	0	20.0	-1.393	-0.898	KNOWN	162.9		142.9
41	45	51	50	0	35.0	-0.789	-0.509	KNOWN	164.4		129.4
42	49	54	50	0	15.0	-0.789	-0.509	KNOWN	163.6		148.6
43	77	67	68	0	10.0	-0.279	-0.180	KNOWN	160.8		150.8
44	41	69	0	0	15.0	-1.656	-1.068	KNOWN	160.4		145.4
45	41	40	39	0	15.0	-0.511	-0.329	KNOWN	160.4		145.4
46	33	32	40	38	20.0	-0.557	-0.359	KNOWN	160.4		140.4
47	39	72	37	0	60.0	-0.588	-0.379	KNOWN	159.7		99.7
48	72	35	0	0	25.0	-1.114	-0.719	KNOWN	158.9		133.9
49	46	48	44	0	20.0	-2.924	-1.887	KNOWN	164.9		144.9
50	36	79	0	0	70.0	-0.882	-0.569	KNOWN	159.8		89.8
51	38	37	36	0	60.0	0.000	0.000	KNOWN	159.8		99.8
52	70	0	0	0	10.0	-0.882	-0.569	KNOWN	158.5		148.5
53	22	0	0	0	20.0	-1.717	-1.108	KNOWN	156.0		136.0
54	34	35	79	0	20.0	-0.588	-0.379	KNOWN	159.8		139.8
55	68	69	70	0	10.0	-0.402	-0.260	KNOWN	160.5		150.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	14.293	9.221
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	0.580	0.374
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	11.795	7.610
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	13.494	8.706
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	4.030	2.600
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	10.908	7.037
80	12	5	16.0	1280.0	75.0	0.5056	KNOWN	0.058	0.037
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	14.021	9.046
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.232	0.150
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	6.869	4.432
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	14.705	9.487
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.227	0.147
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	5.502	3.550
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	12.953	8.357
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.211	0.136
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	10.844	6.996
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.040	0.671
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.412	0.266
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.271	0.175
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	11.199	7.225
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	9.530	6.149
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	19.012	12.266
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	3.779	2.438
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.822	0.530
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	3.394	2.190
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	7.424	4.790
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	10.064	6.493
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	5.736	3.700
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	12.569	8.109
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	0.676	0.436
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	9.274	5.983
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	0.924	0.596
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	4.439	2.864
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.092	0.059
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	2.601	1.678
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	0.943	0.608
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	1.717	1.108
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	3.401	2.194
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	7.138	4.605
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	1.354	0.874
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	1.093	0.705
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	1.259	0.812
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	0.763	0.492
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.346	0.223
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	3.665	2.364
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	3.557	2.295
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	2.251	1.452
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.107	0.069
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	2.609	1.683
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	1.419	0.915
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.638	0.412
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.560	0.361
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	4.044	2.609
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	3.127	2.018
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	3.675	2.371
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.332	0.214
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	0.992	0.640
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.548	0.999
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	1.279	0.825
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.514	0.331
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	2.582	1.666
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.607	0.392
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.570	0.368
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	0.826	0.533
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	4.313	2.782
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.100	0.065
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	5.202	3.356
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	1.515	0.977
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	10.152	6.550
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	1.628	1.050
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	3.409	2.199
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.469	0.303
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	2.124	1.371
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.645	0.416
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.603	0.389
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.310	0.845
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	0.768	0.496
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	0.753	0.486
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.346	0.223
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.557	0.359
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.325	0.210
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	0.882	0.569

TABLE - SLS2

02:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	13.647	8.804		168.8	KNOWN	153.8
2	81	6	7	0	20.0	23.936	15.442	KNOWN	168.6		148.6
3	81	8	0	0	20.0	4.456	2.875	KNOWN	168.6		148.6
4	9	0	0	0	20.0	10.459	6.748	KNOWN	168.3		148.3
5	8	9	80	10	40.0	-0.959	-0.619	KNOWN	168.1		128.1
6	2	6	1	3	10.0	-4.765	-3.074	KNOWN	168.0		158.0
7	1	0	0	0	45.0	0.263	0.170	KNOWN	168.8		123.8
8	3	16	47	0	10.0	-1.485	-0.958	KNOWN	167.2		157.2
9	16	5	15	46	10.0	-1.563	-1.008	KNOWN	167.2		157.2
10	4	5	14	0	10.0	-0.665	-0.429	KNOWN	167.6		157.6
11	15	14	13	28	10.0	-1.919	-1.238	KNOWN	167.0		157.0
12	7	80	13	11	20.0	-1.810	-1.168	KNOWN	168.1		148.1
13	11	12	17	0	20.0	-1.702	-1.098	KNOWN	167.9		147.9
14	10	12	18	0	35.0	-0.665	-0.429	KNOWN	167.9		132.9
15	18	19	73	0	35.0	-1.145	-0.739	KNOWN	165.0		130.0
16	28	17	75	26	15.0	-1.253	-0.809	KNOWN	167.0		152.0
17	19	75	74	0	15.0	-0.866	-0.559	KNOWN	166.4		151.4
18	47	45	49	48	20.0	-1.377	-0.888	KNOWN	166.8		146.8
19	74	20	24	25	15.0	-0.464	-0.299	KNOWN	165.9		150.9
20	73	20	21	0	30.0	-1.702	-1.098	KNOWN	164.3		134.3
21	21	23	22	0	40.0	-1.810	-1.168	KNOWN	161.7		121.7
22	30	29	44	0	10.0	-2.383	-1.537	KNOWN	166.9		156.9
23	24	23	33	34	10.0	-1.129	-0.729	KNOWN	162.7		152.7
24	43	65	64	52	15.0	-0.279	-0.180	KNOWN	164.3		149.3
25	30	43	76	0	10.0	-0.371	-0.240	KNOWN	165.0		155.0
26	42	31	32	0	15.0	-1.052	-0.679	KNOWN	163.2		148.2
27	42	78	77	0	10.0	-0.186	-0.120	KNOWN	163.2		153.2
28	78	66	67	0	10.0	-0.279	-0.180	KNOWN	163.3		153.3
29	65	66	63	71	15.0	-0.263	-0.170	KNOWN	163.9		148.9
30	76	31	82	0	10.0	-0.634	-0.409	KNOWN	164.3		154.3
31	25	82	27	0	10.0	-0.480	-0.309	KNOWN	165.9		155.9
32	26	29	27	0	10.0	-1.362	-0.878	KNOWN	166.9		156.9
33	64	63	62	0	20.0	-1.129	-0.729	KNOWN	164.1		144.1
34	62	60	61	0	20.0	-0.727	-0.469	KNOWN	164.3		144.3
35	71	60	59	0	10.0	-0.727	-0.469	KNOWN	164.1		154.1
36	59	58	57	0	10.0	-0.727	-0.469	KNOWN	164.4		154.4
37	61	58	56	0	15.0	-1.037	-0.669	KNOWN	164.6		149.6
38	56	55	53	0	15.0	-0.727	-0.469	KNOWN	164.9		149.9
39	57	55	54	0	15.0	-0.727	-0.469	KNOWN	164.9		149.9
40	52	53	51	0	20.0	-1.253	-0.809	KNOWN	165.1		145.1
41	45	51	50	0	35.0	-0.727	-0.469	KNOWN	166.5		131.5
42	49	54	50	0	15.0	-0.727	-0.469	KNOWN	165.7		150.7
43	77	67	68	0	10.0	-0.279	-0.180	KNOWN	163.0		153.0
44	41	69	0	0	15.0	-1.625	-1.048	KNOWN	162.6		147.6
45	41	40	39	0	15.0	-0.511	-0.329	KNOWN	162.6		147.6
46	33	32	40	38	20.0	-0.542	-0.349	KNOWN	162.6		142.6
47	39	72	37	0	60.0	-0.588	-0.379	KNOWN	161.9		101.9
48	72	35	0	0	25.0	-1.083	-0.699	KNOWN	161.2		136.2
49	46	48	44	0	20.0	-2.646	-1.707	KNOWN	166.9		146.9
50	36	79	0	0	70.0	-0.866	-0.559	KNOWN	162.0		92.0
51	38	37	36	0	60.0	0.000	0.000	KNOWN	162.0		102.0
52	70	0	0	0	10.0	-0.866	-0.559	KNOWN	160.7		150.7
53	22	0	0	0	20.0	-1.702	-1.098	KNOWN	158.3		138.3
54	34	35	79	0	20.0	-0.588	-0.379	KNOWN	162.0		142.0
55	68	69	70	0	10.0	-0.387	-0.250	KNOWN	162.7		152.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	13.624	8.789
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	0.546	0.352
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	11.409	7.360
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	13.073	8.434
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	3.910	2.523
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	10.459	6.748
80	12	5	16.0	1280.0	75.0	0.5056	KNOWN	0.071	0.046
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	13.481	8.698
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.263	0.170
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	6.533	4.215
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	14.019	9.045
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.209	0.135
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	5.257	3.391
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	12.342	7.963
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.211	0.136
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	10.360	6.684
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.012	0.653
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.398	0.257
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.298	0.192
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	10.794	6.964
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	9.137	5.895
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	18.229	11.761
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	3.679	2.373
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.806	0.520
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	3.340	2.155
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	7.264	4.686
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	9.414	6.073
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	5.591	3.607
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	11.832	7.634
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	0.635	0.410
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	8.588	5.540
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	0.910	0.587
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	4.306	2.778
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.089	0.058
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	2.548	1.644
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	0.965	0.622
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	1.702	1.098
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	3.277	2.114
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	6.533	4.215
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	0.873	0.563
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	0.980	0.632
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	1.232	0.795
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	0.697	0.450
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.340	0.219
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	3.516	2.268
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	3.437	2.218
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	2.208	1.425
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.062	0.040
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	2.525	1.629
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	1.411	0.910
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.678	0.437
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.554	0.358
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	4.113	2.654
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	3.157	2.036
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	3.675	2.371
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.361	0.233
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	0.951	0.613
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.519	0.980
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	1.289	0.832
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.492	0.318
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	2.508	1.618
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.596	0.384
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.540	0.349
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	0.783	0.505
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	4.085	2.636
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.075	0.048
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	4.888	3.153
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	1.435	0.926
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	9.578	6.179
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	1.527	0.985
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	3.432	2.214
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.554	0.358
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	2.179	1.406
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.553	0.357
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.597	0.385
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.296	0.836
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	0.747	0.482
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	0.738	0.476
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.336	0.217
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.558	0.360
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.308	0.199
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	0.866	0.559

TABLE - SLS3

03:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	13.631	8.794		168.8	KNOWN	153.8
2	81	6	7	0	20.0	22.713	14.654	KNOWN	168.5		148.5
3	81	8	0	0	20.0	4.332	2.795	KNOWN	168.5		148.5
4	9	0	0	0	20.0	10.150	6.548	KNOWN	168.2		148.2
5	8	9	80	10	40.0	-0.928	-0.599	KNOWN	168.1		128.1
6	2	6	1	3	10.0	-4.441	-2.865	KNOWN	168.0		158.0
7	1	0	0	0	45.0	0.340	0.220	KNOWN	169.2		124.2
8	3	16	47	0	10.0	-1.733	-1.118	KNOWN	167.2		157.2
9	16	5	15	46	10.0	-1.826	-1.178	KNOWN	167.3		157.3
10	4	5	14	0	10.0	-0.340	-0.220	KNOWN	167.6		157.6
11	15	14	13	28	10.0	-1.857	-1.198	KNOWN	167.0		157.0
12	7	80	13	11	20.0	-1.733	-1.118	KNOWN	168.1		148.1
13	11	12	17	0	20.0	-1.625	-1.048	KNOWN	167.9		147.9
14	10	12	18	0	35.0	-0.634	-0.409	KNOWN	167.9		132.9
15	18	19	73	0	35.0	-1.114	-0.719	KNOWN	165.2		130.2
16	28	17	75	26	15.0	-1.207	-0.779	KNOWN	167.0		152.0
17	19	75	74	0	15.0	-0.836	-0.539	KNOWN	166.5		151.5
18	47	45	49	48	20.0	-1.315	-0.848	KNOWN	166.9		146.9
19	74	20	24	25	15.0	-0.464	-0.299	KNOWN	166.0		151.0
20	73	20	21	0	30.0	-1.625	-1.048	KNOWN	164.5		134.5
21	21	23	22	0	40.0	-1.686	-1.088	KNOWN	162.1		122.1
22	30	29	44	0	10.0	-2.290	-1.477	KNOWN	166.9		156.9
23	24	23	33	34	10.0	[illegible]	[illegible]	KNOWN	[illegible]		[illegible]
24	43	65	64	52	15.0	-0.263	-0.170	KNOWN	164.4		149.4
25	30	43	76	0	10.0	-0.371	-0.240	KNOWN	165.1		155.1
26	42	31	32	0	15.0	-1.052	-0.679	KNOWN	163.4		148.4
27	42	78	77	0	10.0	-0.186	-0.120	KNOWN	163.4		153.4
28	78	66	67	0	10.0	-0.279	-0.180	KNOWN	163.5		153.5
29	65	66	63	71	15.0	-0.263	-0.170	KNOWN	164.1		149.1
30	76	31	82	0	10.0	-0.619	-0.399	KNOWN	164.5		154.5
31	25	82	27	0	10.0	-0.449	-0.289	KNOWN	166.0		156.0
32	26	29	27	0	10.0	-1.315	-0.848	KNOWN	166.9		156.9
33	64	63	62	0	20.0	-1.099	-0.709	KNOWN	164.3		144.3
34	62	60	61	0	20.0	-0.696	-0.449	KNOWN	164.5		144.5
35	71	60	59	0	10.0	-0.696	-0.449	KNOWN	164.2		154.2
36	59	58	57	0	10.0	-0.696	-0.449	KNOWN	164.5		154.5
37	61	58	56	0	15.0	-0.990	-0.639	KNOWN	164.8		149.8
38	56	55	53	0	15.0	-0.696	-0.449	KNOWN	165.0		150.0
39	57	55	54	0	15.0	-0.696	-0.449	KNOWN	165.0		150.0
40	52	53	51	0	20.0	-1.207	-0.779	KNOWN	165.2		145.2
41	45	51	50	0	35.0	-0.696	-0.449	KNOWN	166.5		131.5
42	49	54	50	0	15.0	-0.696	-0.449	KNOWN	165.8		150.8
43	77	67	68	0	10.0	-0.279	-0.180	KNOWN	163.2		153.2
44	41	69	0	0	15.0	-1.625	-1.048	KNOWN	162.8		147.8
45	41	40	39	0	15.0	-0.511	-0.329	KNOWN	162.8		147.8
46	33	32	40	38	20.0	-0.542	-0.349	KNOWN	162.8		142.8
47	39	72	37	0	60.0	-0.588	-0.379	KNOWN	162.1		102.1
48	72	35	0	0	25.0	-1.099	-0.709	KNOWN	161.4		136.4
49	46	48	44	0	20.0	-2.537	-1.637	KNOWN	166.9		146.9
50	36	79	0	0	70.0	-0.866	-0.559	KNOWN	162.2		92.2
51	38	37	36	0	60.0	0.000	0.000	KNOWN	162.2		102.2
52	70	0	0	0	10.0	-0.866	-0.559	KNOWN	160.9		150.9
53	22	0	0	0	20.0	-1.594	-1.028	KNOWN	159.1		139.1
54	34	35	79	0	20.0	-0.588	-0.379	KNOWN	162.2		142.2
55	68	69	70	0	10.0	-0.402	-0.260	KNOWN	162.9		152.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	13.631	8.794
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	0.571	0.368
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	10.673	6.886
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	12.583	8.118
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	3.759	2.425
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	10.146	6.546
80	12	5	16.0	1280.0	75.0	0.5056	KNOWN	0.055	0.035
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	13.033	8.408
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.333	0.215
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	6.520	4.207
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	13.701	8.839
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.238	0.154
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	5.023	3.241
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	12.366	7.978
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.203	0.131
[illegible]	[illegible]	[illegible]	48.0	3350.0	85.0	0.0050	KNOWN	10.094	6.512
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	0.997	0.643
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.384	0.248
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.271	0.175
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	10.412	6.717
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	8.859	5.716
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	17.648	11.386
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	3.540	2.284
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.770	0.496
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	3.196	2.062
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	7.052	4.550
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	9.118	5.883
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	5.448	3.515
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	11.484	7.409
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	0.615	0.397
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	8.390	5.413
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	0.864	0.557
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	4.213	2.718
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.094	0.060
21	20	21	24.0	6720.0	66.0	0.4666	KNOWN	2.436	1.572
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	0.834	0.538
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	1.591	1.026
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	3.207	2.069
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	6.327	4.082
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	8.831	5.936
33	23	46	30.0	4800.0	80.0	[illegible]	KNOWN	[illegible]	0.691
34	23	54	20.0	1700.0	55.0	0.4163	KNOWN	1.246	0.804
43	23	24	16.0	2500.0	64.0	1.3561	KNOWN	0.672	0.433
65	24	29	16.0	3360.0	50.0	2.8182	KNOWN	0.335	0.216
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	3.447	2.224
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	3.373	2.176
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	2.164	1.396
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.050	0.032
31	30	26	20.0	1600.0	70.0	0.1983	KNOWN	2.480	1.600
32	26	46	20.0	1700.0	60.0	0.3544	KNOWN	1.377	0.888
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.680	0.439
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.546	0.352
66	29	28	30.0	2000.0	70.0	[illegible]	KNOWN	[illegible]	2.633
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.0403	KNOWN	3.122	2.014
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	3.638	2.347
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.371	0.239
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	0.935	0.603
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.476	0.953
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	1.289	0.832
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.479	0.309
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	2.465	1.590
59	36	35	16.0	2000.0	80.0	0.7202	KNOWN	0.588	0.379
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.523	0.338
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	0.760	0.490
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	3.977	2.566
55	38	39	30.0	500.0	80.0	0.0082	KNOWN	0.056	0.036
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	4.731	3.052
54	42	39	16.0	900.0	70.0	0.4309	KNOWN	1.398	0.902
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	9.310	6.006
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	1.478	0.954
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	3.369	2.186
41	44	45	30.0	2720.0	70.0	[illegible]	KNOWN	[illegible]	[illegible]
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	2.120	1.367
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.611	0.394
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.598	0.386
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.297	0.837
72	47	48	20.0	5240.0	55.0	1.2712	KNOWN	0.757	0.488
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	0.747	0.482
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.341	0.220
36	51	50	20.0	800.0	110.0	0.0577	KNOWN	0.558	0.360
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.316	0.204
70	55	52	16.0	3700.0	55.0	[illegible]	KNOWN	[illegible]	[illegible]

TABLE - SLS4

04:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	13.631	8.794		168.8	KNOWN	153.8
2	81	6	7	0	20.0	21.955	14.165	KNOWN	168.5		148.5
3	81	8	0	0	20.0	4.348	2.805	KNOWN	168.5		148.5
4	9	0	0	0	20.0	10.150	6.548	KNOWN	168.2		148.2
5	8	9	80	10	40.0	-0.913	-0.589	KNOWN	168.1		128.1
6	2	6	1	3	10.0	-4.007	-2.585	KNOWN	168.0		158.0
7	1	0	0	0	45.0	0.464	0.299	KNOWN	170.2		125.2
8	3	16	47	0	10.0	-1.810	-1.168	KNOWN	167.2		157.2
9	16	5	15	46	10.0	-1.903	-1.228	KNOWN	167.3		157.3
10	4	5	14	0	10.0	-0.325	-0.210	KNOWN	167.6		157.6
11	15	14	13	28	10.0	-1.810	-1.168	KNOWN	167.0		157.0
12	7	80	13	11	20.0	-1.702	-1.098	KNOWN	168.1		148.1
13	11	12	17	0	20.0	-1.609	-1.038	KNOWN	167.8		147.8
14	10	12	18	0	35.0	-0.650	-0.419	KNOWN	167.9		132.9
15	18	19	73	0	35.0	-1.099	-0.709	KNOWN	165.3		130.3
16	28	17	75	26	15.0	-1.176	-0.759	KNOWN	167.0		152.0
17	19	75	74	0	15.0	-0.836	-0.539	KNOWN	166.5		151.5
18	47	45	49	48	20.0	-1.362	-0.878	KNOWN	166.8		146.8
19	74	20	24	25	15.0	-0.464	-0.299	KNOWN	166.0		151.0
20	73	20	21	0	30.0	-1.609	-1.038	KNOWN	164.7		134.7
21	21	23	22	0	40.0	-1.532	-0.988	KNOWN	162.5		122.5
22	30	29	44	0	10.0	-2.243	-1.447	KNOWN	166.9		156.9
23	24	23	33	34	10.0	-0.959	-0.619	KNOWN	163.0		153.0
24	43	65	64	52	15.0	-0.294	-0.190	KNOWN	164.4		149.4
25	30	43	76	0	10.0	-0.371	-0.240	KNOWN	165.1		155.1
26	42	31	32	0	15.0	-1.052	-0.679	KNOWN	163.5		148.5
27	42	78	77	0	10.0	-0.186	-0.120	KNOWN	163.5		153.5
28	78	66	67	0	10.0	-0.294	-0.190	KNOWN	163.6		153.6
29	65	66	63	71	15.0	-0.263	-0.170	KNOWN	164.1		149.1
30	76	31	82	0	10.0	-0.603	-0.389	KNOWN	164.5		154.5
31	25	82	27	0	10.0	-0.433	-0.279	KNOWN	166.1		156.1
32	26	29	27	0	10.0	-1.269	-0.819	KNOWN	166.9		156.9
33	64	63	62	0	20.0	-1.129	-0.729	KNOWN	164.3		144.3
34	62	60	61	0	20.0	-0.712	-0.459	KNOWN	164.5		144.5
35	71	60	59	0	10.0	-0.712	-0.459	KNOWN	164.2		154.2
36	59	58	57	0	10.0	-0.712	-0.459	KNOWN	164.5		154.5
37	61	58	56	0	15.0	-1.037	-0.669	KNOWN	164.7		149.7
38	56	55	53	0	15.0	-0.712	-0.459	KNOWN	165.0		150.0
39	57	55	54	0	15.0	-0.712	-0.459	KNOWN	165.0		150.0
40	52	53	51	0	20.0	-1.238	-0.799	KNOWN	165.2		145.2
41	45	51	50	0	35.0	-0.712	-0.459	KNOWN	166.5		131.5
42	49	54	50	0	15.0	-0.712	-0.459	KNOWN	165.8		150.8
43	77	67	68	0	10.0	-0.294	-0.190	KNOWN	163.2		153.2
44	41	69	0	0	15.0	-1.625	-1.048	KNOWN	162.9		147.9
45	41	40	39	0	15.0	-0.495	-0.319	KNOWN	162.9		147.9
46	33	32	40	38	20.0	-0.542	-0.349	KNOWN	162.9		142.9
47	39	72	37	0	60.0	-0.572	-0.369	KNOWN	162.3		102.3
48	72	35	0	0	25.0	-1.083	-0.699	KNOWN	161.5		136.5
49	46	48	44	0	20.0	-2.630	-1.697	KNOWN	166.9		146.9
50	36	79	0	0	70.0	-0.866	-0.559	KNOWN	162.4		92.4
51	38	37	36	0	60.0	0.000	0.000	KNOWN	162.4		102.4
52	70	0	0	0	10.0	-0.866	-0.559	KNOWN	161.0		151.0
53	22	0	0	0	20.0	-1.439	-0.928	KNOWN	160.0		140.0
54	34	35	79	0	20.0	-0.588	-0.379	KNOWN	162.4		142.4
55	68	69	70	0	10.0	-0.387	-0.250	KNOWN	163.0		153.0

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	13.631	8.794
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	0.663	0.428
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	10.261	6.620
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	12.356	7.971
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	3.677	2.372
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	10.150	6.548
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.032	0.021
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	12.929	8.341
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.448	0.289
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	6.577	4.244
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	13.778	8.889
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.247	0.159
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	5.019	3.238
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	12.461	8.039
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.199	0.128
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	10.112	6.524
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	0.992	0.640
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.378	0.244
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.240	0.155
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	10.262	6.621
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	8.836	5.701
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	17.489	11.283
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	3.442	2.221
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.736	0.475
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	3.080	1.987
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	[illegible]	4.493
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	9.168	5.915
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	5.330	3.439
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	[illegible]	[illegible]
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	[illegible]	[illegible]
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	[illegible]	[illegible]
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	[illegible]	[illegible]
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	[illegible]	[illegible]
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	[illegible]	[illegible]
21	20	21	24.0	6720.0	66.0	0.4666	KNOWN	[illegible]	[illegible]
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	[illegible]	[illegible]
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	[illegible]	[illegible]
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	3.178	2.050
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	6.455	4.164
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	1.017	[illegible]
33	23	46	30.0	4800.0	80.0	[illegible]	KNOWN	[illegible]	[illegible]
34	23	54	20.0	1700.0	55.0	0.4163	KNOWN	1.251	[illegible]
43	23	24	16.0	2500.0	64.0	1.3561	KNOWN	0.688	[illegible]
65	24	29	16.0	3360.0	50.0	2.8182	KNOWN	[illegible]	[illegible]
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	3.403	2.196
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	3.339	2.192
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	2.116	1.366
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.076	0.049
31	30	26	20.0	1600.0	70.0	0.1983	KNOWN	2.444	1.577
32	26	46	20.0	1700.0	60.0	0.3544	KNOWN	[illegible]	[illegible]
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.630	[illegible]
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.528	0.341
66	29	28	30.0	2000.0	70.0	[illegible]	KNOWN	[illegible]	[illegible]
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	[illegible]	[illegible]
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	[illegible]	[illegible]
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	[illegible]	[illegible]
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	[illegible]	[illegible]
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	[illegible]	[illegible]
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	[illegible]	[illegible]
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	[illegible]	[illegible]
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	[illegible]	[illegible]
59	36	35	16.0	2000.0	80.0	0.7202	KNOWN	[illegible]	[illegible]
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.529	0.338
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	0.762	0.492
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	3.987	2.572
55	38	39	30.0	500.0	80.0	0.0082	KNOWN	[illegible]	[illegible]
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	[illegible]	[illegible]
54	42	39	16.0	900.0	70.0	0.4309	KNOWN	[illegible]	[illegible]
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	9.346	6.030
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	[illegible]	[illegible]
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	[illegible]	[illegible]
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.319	[illegible]
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	[illegible]	[illegible]
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.726	0.468
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.585	0.378
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.273	0.821
72	47	48	20.0	5240.0	55.0	1.2712	KNOWN	0.746	0.482
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	0.733	0.473
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.337	0.217
36	51	50	20.0	800.0	110.0	0.0577	KNOWN	0.540	0.348
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.326	0.211
70	55	52	16.0	3700.0	55.0	[illegible]	KNOWN	[illegible]	[illegible]

TABLE - SLS5

05:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	13.523	8.724		168.8	KNOWN	153.8
2	81	6	7	0	20.0	21.182	13.666	KNOWN	168.5		148.5
3	81	8	0	0	20.0	4.812	3.104	KNOWN	168.5		148.5
4	9	0	0	0	20.0	11.248	7.257	KNOWN	168.3		148.3
5	8	9	80	10	40.0	-0.897	-0.579	KNOWN	168.2		128.2
6	2	6	1	3	10.0	-3.945	-2.545	KNOWN	168.0		158.0
7	1	0	0	0	45.0	0.480	0.309	KNOWN	170.5		125.5
8	3	16	47	0	10.0	-2.228	-1.437	KNOWN	167.2		157.2
9	16	5	15	46	10.0	-2.336	-1.507	KNOWN	167.2		157.2
10	4	5	14	0	10.0	-0.015	-0.010	KNOWN	167.6		157.6
11	15	14	13	28	10.0	-1.779	-1.148	KNOWN	167.0		157.0
12	7	80	13	11	20.0	-1.686	-1.088	KNOWN	168.1		148.1
13	11	12	17	0	20.0	-1.578	-1.018	KNOWN	167.9		147.9
14	10	12	18	0	35.0	-0.634	-0.409	KNOWN	167.9		132.9
15	18	19	73	0	35.0	-1.207	-0.779	KNOWN	165.2		130.2
16	28	17	75	26	15.0	-1.160	-0.749	KNOWN	167.0		152.0
17	19	75	74	0	15.0	-0.805	-0.519	KNOWN	166.5		151.5
18	47	45	49	48	20.0	-1.331	-0.858	KNOWN	166.8		146.8
19	74	20	24	25	15.0	-0.495	-0.319	KNOWN	166.0		151.0
20	73	20	21	0	30.0	-1.578	-1.018	KNOWN	164.6		134.6
21	21	23	22	0	40.0	-1.501	-0.968	KNOWN	162.4		122.4
22	30	29	44	0	10.0	-2.213	-1.427	KNOWN	166.9		156.9
23	24	23	33	34	10.0	-0.944	-0.609	KNOWN	162.8		152.8
24	43	65	64	52	15.0	-0.294	-0.190	KNOWN	164.3		149.3
25	30	43	76	0	10.0	-0.356	-0.230	KNOWN	165.0		155.0
26	42	31	32	0	15.0	-1.129	-0.729	KNOWN	163.3		148.3
27	42	78	77	0	10.0	-0.186	-0.120	KNOWN	163.3		153.3
28	78	66	67	0	10.0	-0.309	-0.200	KNOWN	163.4		153.4
29	65	66	63	71	15.0	-0.263	-0.170	KNOWN	164.0		149.0
30	76	31	82	0	10.0	-0.588	-0.379	KNOWN	164.4		154.4
31	25	82	27	0	10.0	-0.433	-0.279	KNOWN	166.0		156.0
32	26	29	27	0	10.0	-1.253	-0.809	KNOWN	166.9		156.9
33	64	63	62	0	20.0	-1.114	-0.719	KNOWN	164.2		144.2
34	62	60	61	0	20.0	-0.696	-0.449	KNOWN	164.4		144.4
35	71	60	59	0	10.0	-0.696	-0.449	KNOWN	164.2		154.2
36	59	58	57	0	10.0	-0.696	-0.449	KNOWN	164.4		154.4
37	61	58	56	0	15.0	-1.021	-0.659	KNOWN	164.7		149.7
38	56	55	53	0	15.0	-0.696	-0.449	KNOWN	165.0		150.0
39	57	55	54	0	15.0	-0.696	-0.449	KNOWN	165.0		150.0
40	52	53	51	0	20.0	-1.222	-0.789	KNOWN	165.2		145.2
41	45	51	50	0	35.0	-0.696	-0.449	KNOWN	166.5		131.5
42	49	54	50	0	15.0	-0.696	-0.449	KNOWN	165.8		150.8
43	77	67	68	0	10.0	-0.309	-0.200	KNOWN	163.0		153.0
44	41	69	0	0	15.0	-1.748	-1.128	KNOWN	162.6		147.6
45	41	40	39	0	15.0	-0.542	-0.349	KNOWN	162.6		147.6
46	33	32	40	38	20.0	-0.588	-0.379	KNOWN	162.6		142.6
47	39	72	37	0	60.0	-0.619	-0.399	KNOWN	161.9		101.9
48	72	35	0	0	25.0	-1.160	-0.749	KNOWN	161.1		136.1
49	46	48	44	0	20.0	-2.584	-1.667	KNOWN	166.9		146.9
50	36	79	0	0	70.0	-0.928	-0.599	KNOWN	162.0		92.0
51	38	37	36	0	60.0	0.000	0.000	KNOWN	162.0		102.0
52	70	0	0	0	10.0	-0.928	-0.599	KNOWN	160.5		150.5
53	22	0	0	0	20.0	-1.423	-0.918	KNOWN	159.9		139.9
54	34	35	79	0	20.0	-0.619	-0.399	KNOWN	162.1		142.1
55	68	69	70	0	10.0	-0.418	-0.270	KNOWN	162.8		152.8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	13.523	8.724
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	1.357	0.875
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	10.509	6.780
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	12.029	7.761
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	3.455	2.229
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	11.248	7.257
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.211	0.136
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	13.595	8.771
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.480	0.309
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	6.759	4.361
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	13.835	8.926
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.291	0.188
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	4.822	3.111
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	12.782	8.247
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.187	0.120
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	9.994	6.447
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	0.982	0.634
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.385	0.249
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.223	0.144
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	10.169	6.560
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	9.426	6.081
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	18.017	11.624
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	3.535	2.280
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.755	0.487
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	3.082	1.989
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	7.065	4.558
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	9.572	6.175
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	5.505	3.552
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	11.653	7.518
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	0.623	0.402
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	8.782	5.666
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	0.833	0.537
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	4.269	2.754
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.091	0.059
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	2.337	1.508
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	0.587	0.379
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	1.423	0.918
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	3.248	2.095
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	6.832	4.408
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	1.364	0.880
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	1.393	0.898
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	1.345	0.868
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	0.696	0.449
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.342	0.220
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	3.503	2.260
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	3.443	2.221
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	2.196	1.417
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.056	0.036
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	2.563	1.654
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	1.378	0.889
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.688	0.444
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.558	0.360
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	4.184	2.699
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	3.186	2.056
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	3.717	2.398
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.388	0.251
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	0.955	0.616
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.479	0.954
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	1.327	0.856
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.484	0.313
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	2.508	1.618
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.600	0.387
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.526	0.339
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	0.770	0.497
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	4.056	2.616
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.043	0.027
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	4.794	3.093
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	1.424	0.919
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	9.460	6.103
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	1.497	0.966
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	3.435	2.216
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.340	0.220
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	2.089	1.348
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.826	0.533
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.625	0.403
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.357	0.875
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	0.799	0.515
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	0.793	0.512
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.362	0.233
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.564	0.364
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.364	0.235
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	0.928	0.599

TABLE - SLS6

06:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	17.870	11.529		160.9	KNOWN	145.9
2	81	6	7	0	20.0	21.135	13.636	KNOWN	160.1		140.1
3	81	8	0	0	20.0	5.988	3.863	KNOWN	160.1		140.1
4	9	0	0	0	20.0	14.296	9.223	KNOWN	160.0		140.0
5	8	9	80	10	40.0	-0.990	-0.639	KNOWN	159.8		119.8
6	2	6	1	3	10.0	-4.394	-2.835	KNOWN	159.5		149.5
7	1	0	0	0	45.0	-0.077	-0.050	KNOWN	159.3		114.3
8	3	16	47	0	10.0	-3.868	-2.496	KNOWN	158.4		148.4
9	16	5	15	46	10.0	-4.069	-2.625	KNOWN	158.5		148.5
10	4	5	14	0	10.0	-0.015	-0.010	KNOWN	159.0		149.0
11	15	14	13	28	10.0	-1.965	-1.268	KNOWN	158.3		148.3
12	7	80	13	11	20.0	-1.857	-1.198	KNOWN	159.7		139.7
13	11	12	17	0	20.0	-1.748	-1.128	KNOWN	159.4		139.4
14	10	12	18	0	35.0	-0.634	-0.409	KNOWN	159.5		124.5
15	18	19	73	0	35.0	-1.454	-0.938	KNOWN	156.0		121.0
16	28	17	75	26	15.0	-1.269	-0.819	KNOWN	158.3		143.3
17	19	75	74	0	15.0	-0.882	-0.569	KNOWN	157.6		142.6
18	47	45	49	48	20.0	-1.331	-0.858	KNOWN	158.1		138.1
19	74	20	24	25	15.0	-0.588	-0.379	KNOWN	157.0		142.0
20	73	20	21	0	30.0	-1.748	-1.128	KNOWN	155.3		125.3
21	21	23	22	0	40.0	-1.686	-1.088	KNOWN	152.4		112.4
22	30	29	44	0	10.0	-2.429	-1.567	KNOWN	158.1		148.1
23	24	23	33	34	10.0	-1.052	-0.679	KNOWN	152.8		142.8
24	43	65	64	52	15.0	-0.279	-0.180	KNOWN	155.1		140.1
25	30	43	76	0	10.0	-0.402	-0.260	KNOWN	155.8		145.8
26	42	31	32	0	15.0	-1.346	-0.868	KNOWN	153.5		138.5
27	42	78	77	0	10.0	-0.232	-0.150	KNOWN	153.5		143.5
28	78	66	67	0	10.0	-0.371	-0.240	KNOWN	153.7		143.7
29	65	66	63	71	15.0	-0.263	-0.170	KNOWN	154.6		139.6
30	76	31	82	0	10.0	-0.650	-0.419	KNOWN	155.0		145.0
31	25	82	27	0	10.0	-0.480	-0.309	KNOWN	157.0		147.0
32	26	29	27	0	10.0	-1.393	-0.898	KNOWN	158.2		148.2
33	64	63	62	0	20.0	-1.114	-0.719	KNOWN	154.9		134.9
34	62	60	61	0	20.0	-0.696	-0.449	KNOWN	155.2		135.2
35	71	60	59	0	10.0	-0.696	-0.449	KNOWN	154.9		144.9
36	59	58	57	0	10.0	-0.696	-0.449	KNOWN	155.3		145.3
37	61	58	56	0	15.0	-1.021	-0.659	KNOWN	155.6		140.6
38	56	55	53	0	15.0	-0.696	-0.449	KNOWN	155.9		140.9
39	57	55	54	0	15.0	-0.696	-0.449	KNOWN	155.9		140.9
40	52	53	51	0	20.0	-1.222	-0.789	KNOWN	156.1		136.1
41	45	51	50	0	35.0	-0.696	-0.449	KNOWN	157.7		122.7
42	49	54	50	0	15.0	-0.696	-0.449	KNOWN	156.9		141.9
43	77	67	68	0	10.0	-0.371	-0.240	KNOWN	153.2		143.2
44	41	69	0	0	15.0	-2.104	-1.358	KNOWN	152.6		137.6
45	41	40	39	0	15.0	-0.634	-0.409	KNOWN	152.6		137.6
46	33	32	40	38	20.0	-0.696	-0.449	KNOWN	152.6		132.6
47	39	72	37	0	60.0	-0.743	-0.479	KNOWN	151.6		91.6
48	72	35	0	0	25.0	-1.393	-0.898	KNOWN	150.4		125.4
49	46	48	44	0	20.0	-2.568	-1.657	KNOWN	158.1		138.1
50	36	79	0	0	70.0	-1.114	-0.719	KNOWN	151.7		81.7
51	38	37	36	0	60.0	0.000	0.000	KNOWN	151.8		91.8
52	70	0	0	0	10.0	-1.114	-0.719	KNOWN	149.6		139.6
53	22	0	0	0	20.0	-1.578	-1.018	KNOWN	149.4		129.4
54	34	35	79	0	20.0	-0.758	-0.489	KNOWN	151.8		131.8
55	68	69	70	0	10.0	-0.511	-0.329	KNOWN	152.8		142.8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	17.870	11.529
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.654	1.712
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	11.084	7.151
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	12.705	8.197
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	3.334	2.151
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	14.296	9.223
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.420	0.271
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	16.220	10.464
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	0.138	0.089
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	8.158	5.263
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	16.325	10.532
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.408	0.263
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	4.698	3.031
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	15.214	9.816
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.184	0.118
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	10.553	6.809
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.096	0.707
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.435	0.281
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.251	0.162
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	10.834	6.990
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	11.534	7.441
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	20.619	13.303
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	4.052	2.614
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.865	0.558
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	3.463	2.234
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	8.066	5.204
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	11.033	7.118
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	6.319	4.077
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	12.552	8.098
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	0.666	0.430
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	9.852	6.356
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	0.946	0.610
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	4.910	3.167
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.125	0.081
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	2.660	1.716
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	0.604	0.390
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	1.578	1.018
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	3.660	2.361
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	7.955	5.132
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	1.866	1.204
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	1.636	1.056
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	1.617	1.043
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	0.721	0.465
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.402	0.259
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	3.967	2.559
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	3.926	2.533
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	2.536	1.636
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.022	0.014
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	2.968	1.915
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	1.643	1.060
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.910	0.587
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.656	0.423
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	5.167	3.333
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	3.888	2.507
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	4.494	2.899
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.534	0.345
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.081	0.697
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.686	1.088
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	1.641	1.059
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.531	0.343
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	2.869	1.851
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.699	0.451
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.561	0.362
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	0.834	0.538
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	4.451	2.872
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.033	0.021
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	5.114	3.300
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	1.563	1.009
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	10.263	6.621
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	1.593	1.028
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	4.170	2.690
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.441	0.285
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	2.546	1.642
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.946	0.610
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.753	0.486
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.637	1.056
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	0.959	0.619
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	0.949	0.612
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.433	0.280
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.688	0.444
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.426	0.275
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.114	0.719

TABLE - SLS7

07:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	22.388	14.444		152.8	KNOWN	137.8
2	81	6	7	0	20.0	22.620	14.594	KNOWN	151.4		131.4
3	81	8	0	0	20.0	6.993	4.512	KNOWN	151.4		131.4
4	9	0	0	0	20.0	16.571	10.691	KNOWN	151.2		131.2
5	8	9	80	10	40.0	-1.129	-0.729	KNOWN	150.9		110.9
6	2	6	1	3	10.0	-4.580	-2.955	KNOWN	150.7		140.7
7	1	0	0	0	45.0	-0.402	-0.260	KNOWN	148.9		103.9
8	3	16	47	0	10.0	-4.827	-3.114	KNOWN	149.1		139.1
9	16	5	15	46	10.0	-5.075	-3.274	KNOWN	149.3		139.3
10	4	5	14	0	10.0	-0.015	-0.010	KNOWN	150.0		140.0
11	15	14	13	28	10.0	-2.228	-1.437	KNOWN	149.1		139.1
12	7	80	13	11	20.0	-2.104	-1.358	KNOWN	150.8		130.8
13	11	12	17	0	20.0	-1.980	-1.278	KNOWN	150.5		130.5
14	10	12	18	0	35.0	-0.758	-0.489	KNOWN	150.6		115.6
15	18	19	73	0	35.0	-1.764	-1.138	KNOWN	146.1		111.1
16	28	17	75	26	15.0	-1.439	-0.928	KNOWN	149.1		134.1
17	19	75	74	0	15.0	-1.006	-0.649	KNOWN	148.2		133.2
18	47	45	49	48	20.0	-1.578	-1.018	KNOWN	148.7		128.7
19	74	20	24	25	15.0	-0.681	-0.439	KNOWN	147.4		132.4
20	73	20	21	0	30.0	-1.980	-1.278	KNOWN	145.3		115.3
21	21	23	22	0	40.0	-1.733	-1.118	KNOWN	141.9		101.9
22	30	29	44	0	10.0	-2.754	-1.777	KNOWN	148.8		138.8
23	24	23	33	34	10.0	-1.083	-0.699	KNOWN	142.2		132.2
24	43	65	64	52	15.0	-0.325	-0.210	KNOWN	144.9		129.9
25	30	43	76	0	10.0	-0.449	-0.289	KNOWN	145.9		135.9
26	42	31	32	0	15.0	-1.563	-1.008	KNOWN	142.9		127.9
27	42	78	77	0	10.0	-0.263	-0.170	KNOWN	142.9		132.9
28	78	66	67	0	10.0	-0.433	-0.279	KNOWN	143.1		133.1
29	65	66	63	71	15.0	-0.309	-0.200	KNOWN	144.2		129.2
30	76	31	82	0	10.0	-0.727	-0.469	KNOWN	144.8		134.8
31	25	82	27	0	10.0	-0.542	-0.349	KNOWN	147.4		137.4
32	26	29	27	0	10.0	-1.578	-1.018	KNOWN	148.9		138.9
33	64	63	62	0	20.0	-1.315	-0.848	KNOWN	144.6		124.6
34	62	60	61	0	20.0	-0.820	-0.529	KNOWN	145.0		125.0
35	71	60	59	0	10.0	-0.820	-0.529	KNOWN	144.6		134.6
36	59	58	57	0	10.0	-0.820	-0.529	KNOWN	145.1		135.1
37	61	58	56	0	15.0	-1.191	-0.769	KNOWN	145.5		130.5
38	56	55	53	0	15.0	-0.820	-0.529	KNOWN	145.9		130.9
39	57	55	54	0	15.0	-0.820	-0.529	KNOWN	145.9		130.9
40	52	53	51	0	20.0	-1.439	-0.928	KNOWN	146.2		126.2
41	45	51	50	0	35.0	-0.820	-0.529	KNOWN	148.2		113.2
42	49	54	50	0	15.0	-0.820	-0.529	KNOWN	147.2		132.2
43	77	67	68	0	10.0	-0.433	-0.279	KNOWN	142.5		132.5
44	41	69	0	0	15.0	-2.414	-1.557	KNOWN	141.8		126.8
45	41	40	39	0	15.0	-0.743	-0.479	KNOWN	141.8		126.8
46	33	32	40	38	20.0	-0.805	-0.519	KNOWN	141.9		121.9
47	39	72	37	0	60.0	-0.851	-0.549	KNOWN	140.6		80.6
48	72	35	0	0	25.0	-1.609	-1.038	KNOWN	139.0		114.0
49	46	48	44	0	20.0	-3.048	-1.966	KNOWN	148.8		128.8
50	36	79	0	0	70.0	-1.300	-0.838	KNOWN	140.7		70.7
51	38	37	36	0	60.0	0.000	0.000	KNOWN	140.8		80.8
52	70	0	0	0	10.0	-1.300	-0.838	KNOWN	137.9		127.9
53	22	0	0	0	20.0	-1.625	-1.048	KNOWN	138.8		118.8
54	34	35	79	0	20.0	-0.866	-0.559	KNOWN	140.8		120.8
55	68	69	70	0	10.0	-0.588	-0.379	KNOWN	142.1		132.1

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	22.387	14.443
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.297	2.127
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	11.594	7.480
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	14.323	9.241
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	3.697	2.385
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	16.571	10.691
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.504	0.325
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	18.634	12.022
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	0.402	0.260
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	9.684	6.248
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	19.317	12.463
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.493	0.318
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	5.350	3.451
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	18.021	11.626
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.208	0.134
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	12.245	7.900
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.281	0.826
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.493	0.318
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.246	0.159
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	12.229	7.890
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	13.275	8.565
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	23.524	15.177
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	4.601	2.968
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.980	0.632
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	3.816	2.462
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	9.135	5.894
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	12.704	8.196
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	7.150	4.613
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	14.489	9.348
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	0.771	0.497
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	11.488	7.412
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.060	0.684
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	5.540	3.574
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.130	0.084
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	2.896	1.868
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	0.462	0.298
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	1.625	1.048
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	4.172	2.692
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	9.218	5.947
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.292	1.479
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.105	1.358
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	1.890	1.219
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	0.847	0.546
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.455	0.294
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	4.535	2.926
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	4.468	2.883
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	2.877	1.856
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.009	0.006
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	3.386	2.184
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	1.821	1.175
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.002	0.646
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.741	0.478
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	5.786	3.733
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	4.351	2.807
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	5.056	3.262
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.585	0.377
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.236	0.797
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.908	1.231
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	1.836	1.185
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.612	0.395
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	3.268	2.108
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.793	0.512
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.651	0.420
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	0.962	0.621
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	5.110	3.297
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.013	0.009
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	5.917	3.817
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	1.796	1.158
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	11.824	7.628
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	1.845	1.190
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	4.659	3.006
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.358	0.231
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	2.771	1.788
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.247	0.804
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.861	0.556
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.875	1.209
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.107	0.714
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.097	0.708
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.502	0.324
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.778	0.502
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.522	0.337
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.300	0.838

TABLE - SLS8

08:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	23.936	15.442		150.0	KNOWN	135.0
2	81	6	7	0	20.0	27.169	17.529	KNOWN	148.6		128.6
3	81	8	0	0	20.0	7.798	5.031	KNOWN	148.6		128.6
4	9	0	0	0	20.0	18.830	12.148	KNOWN	148.4		128.4
5	8	9	80	10	40.0	-1.284	-0.829	KNOWN	148.1		108.1
6	2	6	1	3	10.0	-5.988	-3.863	KNOWN	147.6		137.6
7	1	0	0	0	45.0	-0.062	-0.040	KNOWN	147.3		102.3
8	3	16	47	0	10.0	-4.765	-3.074	KNOWN	145.8		135.8
9	16	5	15	46	10.0	-4.998	-3.224	KNOWN	146.0		136.0
10	4	5	14	0	10.0	-0.743	-0.479	KNOWN	146.8		136.8
11	15	14	13	28	10.0	-2.553	-1.647	KNOWN	145.6		135.6
12	7	80	13	11	20.0	-2.414	-1.557	KNOWN	147.9		127.9
13	11	12	17	0	20.0	-2.259	-1.457	KNOWN	147.5		127.5
14	10	12	18	0	35.0	-0.866	-0.559	KNOWN	147.6		112.6
15	18	19	73	0	35.0	-1.857	-1.198	KNOWN	141.9		106.9
16	28	17	75	26	15.0	-1.656	-1.068	KNOWN	145.7		130.7
17	19	75	74	0	15.0	-1.160	-0.749	KNOWN	144.5		129.5
18	47	45	49	48	20.0	-1.826	-1.178	KNOWN	145.2		125.2
19	74	20	24	25	15.0	-0.727	-0.469	KNOWN	143.6		128.6
20	73	20	21	0	30.0	-2.259	-1.457	KNOWN	140.8		110.8
21	21	23	22	0	40.0	-2.290	-1.477	KNOWN	138.0		98.0
22	30	29	44	0	10.0	-3.172	-2.046	KNOWN	145.4		135.4
23	24	23	33	34	10.0	-1.423	-0.918	KNOWN	137.0		127.0
24	43	65	64	52	15.0	-0.371	-0.240	KNOWN	140.4		125.4
25	30	43	76	0	10.0	-0.511	-0.329	KNOWN	141.7		131.7
26	42	31	32	0	15.0	-1.671	-1.078	KNOWN	138.1		123.1
27	42	78	77	0	10.0	-0.294	-0.190	KNOWN	138.1		128.1
28	78	66	67	0	10.0	-0.449	-0.289	KNOWN	138.3		128.3
29	65	66	63	71	15.0	-0.356	-0.230	KNOWN	139.6		124.6
30	76	31	82	0	10.0	-0.851	-0.549	KNOWN	140.4		130.4
31	25	82	27	0	10.0	-0.619	-0.399	KNOWN	143.6		133.6
32	26	29	27	0	10.0	-1.810	-1.168	KNOWN	145.5		135.5
33	64	63	62	0	20.0	-1.501	-0.968	KNOWN	140.1		120.1
34	62	60	61	0	20.0	-0.959	-0.619	KNOWN	140.6		120.6
35	71	60	59	0	10.0	-0.959	-0.619	KNOWN	140.1		130.1
36	59	58	57	0	10.0	-0.959	-0.619	KNOWN	140.7		130.7
37	61	58	56	0	15.0	-1.362	-0.878	KNOWN	141.1		126.1
38	56	55	53	0	15.0	-0.959	-0.619	KNOWN	141.7		126.7
39	57	55	54	0	15.0	-0.959	-0.619	KNOWN	141.7		126.7
40	52	53	51	0	20.0	-1.640	-1.058	KNOWN	142.0		122.0
41	45	51	50	0	35.0	-0.959	-0.619	KNOWN	144.6		109.6
42	49	54	50	0	15.0	-0.959	-0.619	KNOWN	143.3		128.3
43	77	67	68	0	10.0	-0.449	-0.289	KNOWN	137.6		127.6
44	41	69	0	0	15.0	-2.584	-1.667	KNOWN	136.7		121.7
45	41	40	39	0	15.0	-0.805	-0.519	KNOWN	136.7		121.7
46	33	32	40	38	20.0	-0.866	-0.559	KNOWN	136.7		116.7
47	39	72	37	0	60.0	-0.913	-0.589	KNOWN	135.2		75.2
48	72	35	0	0	25.0	-1.717	-1.108	KNOWN	133.5		108.5
49	46	48	44	0	20.0	-3.481	-2.246	KNOWN	145.4		125.4
50	36	79	0	0	70.0	-1.377	-0.888	KNOWN	135.4		65.4
51	38	37	36	0	60.0	0.000	0.000	KNOWN	135.5		75.5
52	70	0	0	0	10.0	-1.377	-0.888	KNOWN	132.3		122.3
53	22	0	0	0	20.0	-2.151	-1.388	KNOWN	130.7		110.7
54	34	35	79	0	20.0	-0.928	-0.599	KNOWN	135.5		115.5
55	68	69	70	0	10.0	-0.634	-0.409	KNOWN	137.0		127.0

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	23.936	15.442
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.549	2.290
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	14.316	9.236
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	16.403	10.582
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	4.249	2.741
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	18.830	12.148
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.568	0.366
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	21.226	13.694
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	0.161	0.104
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	10.556	6.810
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	21.646	13.965
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.500	0.322
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	6.290	4.058
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	19.494	12.577
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.238	0.154
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	13.759	8.877
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.409	0.909
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.566	0.365
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.340	0.219
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	13.991	9.027
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	15.110	9.748
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	26.842	17.317
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	5.250	3.387
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.121	0.723
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	4.514	2.912
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	10.374	6.693
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	14.472	9.337
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	8.093	5.221
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	16.485	10.636
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	0.880	0.567
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	12.901	8.323
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.234	0.796
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	6.285	4.055
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.153	0.099
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	3.489	2.251
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	0.952	0.614
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	2.151	1.388
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	4.706	3.036
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	10.501	6.775
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.623	1.692
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	1.928	1.244
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	1.982	1.279
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	0.964	0.622
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.508	0.327
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	5.096	3.288
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	5.011	3.233
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.232	2.085
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.023	0.015
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	3.770	2.432
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.076	1.339
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.099	0.709
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.828	0.534
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	6.384	4.119
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	4.836	3.120
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	5.609	3.618
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.624	0.402
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.389	0.896
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.161	1.394
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	2.014	1.299
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.697	0.450
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	3.670	2.368
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.886	0.571
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.748	0.483
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.097	0.708
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	5.780	3.729
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.027	0.017
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	6.766	4.365
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.029	1.309
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	13.417	8.656
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.109	1.360
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	5.216	3.365
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.621	0.401
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.205	2.068
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.115	0.719
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.931	0.600
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.023	1.305
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.184	0.764
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.166	0.752
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.534	0.344
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.857	0.553
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.520	0.335
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.377	0.888

TABLE - SLS9

09:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	26.071	16.820		146.3	KNOWN	131.3
2	81	6	7	0	20.0	33.265	21.462	KNOWN	144.8		124.8
3	81	8	0	0	20.0	8.154	5.261	KNOWN	144.8		124.8
4	9	0	0	0	20.0	19.217	12.398	KNOWN	144.3		124.3
5	8	9	80	10	40.0	-1.470	-0.948	KNOWN	143.9		103.9
6	2	6	1	3	10.0	-6.993	-4.512	KNOWN	143.5		133.5
7	1	0	0	0	45.0	0.402	0.260	KNOWN	145.3		100.3
8	3	16	47	0	10.0	-4.239	-2.735	KNOWN	141.3		131.3
9	16	5	15	46	10.0	-4.456	-2.875	KNOWN	141.5		131.5
10	4	5	14	0	10.0	-1.393	-0.898	KNOWN	142.5		132.5
11	15	14	13	28	10.0	-2.909	-1.877	KNOWN	141.0		131.0
12	7	80	13	11	20.0	-2.739	-1.767	KNOWN	143.8		123.8
13	11	12	17	0	20.0	-2.568	-1.657	KNOWN	143.3		123.3
14	10	12	18	0	35.0	-1.037	-0.669	KNOWN	143.4		108.4
15	18	19	73	0	35.0	-1.888	-1.218	KNOWN	136.5		101.5
16	28	17	75	26	15.0	-1.888	-1.218	KNOWN	141.1		126.1
17	19	75	74	0	15.0	-1.315	-0.848	KNOWN	139.6		124.6
18	47	45	49	48	20.0	-2.166	-1.397	KNOWN	140.5		120.5
19	74	20	24	25	15.0	-0.805	-0.519	KNOWN	138.4		123.4
20	73	20	21	0	30.0	-2.568	-1.657	KNOWN	134.9		104.9
21	21	23	22	0	40.0	-2.677	-1.727	KNOWN	128.8		88.8
22	30	29	44	0	10.0	-3.605	-2.326	KNOWN	140.7		130.7
23	24	23	33	34	10.0	-1.671	-1.078	KNOWN	130.1		120.1
24	43	65	64	52	15.0	-0.449	-0.289	KNOWN	134.3		119.3
25	30	43	76	0	10.0	-0.588	-0.379	KNOWN	136.0		126.0
26	42	31	32	0	15.0	-1.841	-1.188	KNOWN	131.5		116.5
27	42	78	77	0	10.0	-0.325	-0.210	KNOWN	131.5		121.5
28	78	66	67	0	10.0	-0.495	-0.319	KNOWN	131.8		121.8
29	65	66	63	71	15.0	-0.433	-0.279	KNOWN	133.3		118.3
30	76	31	82	0	10.0	-0.959	-0.619	KNOWN	134.4		124.4
31	25	82	27	0	10.0	-0.712	-0.459	KNOWN	138.5		128.5
32	26	29	27	0	10.0	-2.058	-1.328	KNOWN	140.8		130.8
33	64	63	62	0	20.0	-1.795	-1.158	KNOWN	133.9		113.9
34	62	60	61	0	20.0	-1.129	-0.729	KNOWN	134.5		114.5
35	71	60	59	0	10.0	-1.129	-0.729	KNOWN	133.8		123.8
36	59	58	57	0	10.0	-1.129	-0.729	KNOWN	134.6		124.6
37	61	58	56	0	15.0	-1.640	-1.058	KNOWN	135.2		120.2
38	56	55	53	0	15.0	-1.129	-0.729	KNOWN	135.9		120.9
39	57	55	54	0	15.0	-1.129	-0.729	KNOWN	135.9		120.9
40	52	53	51	0	20.0	-1.965	-1.268	KNOWN	136.3		116.3
41	45	51	50	0	35.0	-1.129	-0.729	KNOWN	139.7		104.7
42	49	54	50	0	15.0	-1.129	-0.729	KNOWN	137.9		122.9
43	77	67	68	0	10.0	-0.495	-0.319	KNOWN	130.9		120.9
44	41	69	0	0	15.0	-2.862	-1.847	KNOWN	129.8		114.8
45	41	40	39	0	15.0	-0.882	-0.569	KNOWN	129.8		114.8
46	33	32	40	38	20.0	-0.959	-0.619	KNOWN	129.8		109.8
47	39	72	37	0	60.0	-1.006	-0.649	KNOWN	128.0		68.0
48	72	35	0	0	25.0	-1.903	-1.228	KNOWN	125.9		100.9
49	46	48	44	0	20.0	-4.162	-2.685	KNOWN	140.7		120.7
50	36	79	0	0	70.0	-1.532	-0.988	KNOWN	128.3		58.3
51	38	37	36	0	60.0	0.000	0.000	KNOWN	128.3		68.3
52	70	0	0	0	10.0	-1.532	-0.988	KNOWN	124.5		114.5
53	22	0	0	0	20.0	-2.507	-1.617	KNOWN	121.7		101.7
54	34	35	79	0	20.0	-1.021	-0.659	KNOWN	128.4		108.4
55	68	69	70	0	10.0	-0.696	-0.449	KNOWN	130.2		120.2

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	26.045	16.803
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.676	1.727
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	16.463	10.621
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	19.479	12.567
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	5.478	3.534
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	19.217	12.398
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.433	0.280
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	22.791	14.704
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.402	0.260
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	11.560	7.458
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	24.383	15.731
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.476	0.307
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	7.796	5.030
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	21.381	13.794
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.295	0.190
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	16.153	10.422
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.609	1.038
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.636	0.411
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.368	0.237
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	16.537	10.669
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	15.905	10.262
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	29.874	19.274
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	5.849	3.774
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.245	0.804
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	5.207	3.359
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	11.698	7.547
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	15.921	10.272
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	9.137	5.895
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	19.061	12.297
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.019	0.657
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	14.449	9.322
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.385	0.894
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.109	4.586
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.162	0.104
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	4.024	2.596
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.159	0.748
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	2.507	1.617
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.353	3.453
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	11.416	7.365
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.458	1.586
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.090	1.348
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.189	1.412
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.130	0.729
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.569	0.367
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	5.795	3.739
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	5.683	3.666
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.635	2.345
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.081	0.052
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.249	2.742
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.327	1.502
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.175	0.758
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.931	0.601
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.022	4.530
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.351	3.453
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	6.222	4.014
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.664	0.428
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.574	1.015
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.448	1.579
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	2.222	1.433
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.797	0.514
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	4.149	2.677
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.996	0.643
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.862	0.556
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.263	0.815
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	6.651	4.291
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.058	0.037
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	7.839	5.057
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.335	1.506
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	15.486	9.991
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.445	1.578
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	5.787	3.734
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.697	0.450
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.559	2.296
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.216	0.785
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.031	0.665
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.242	1.446
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.312	0.846
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.286	0.830
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.591	0.382
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.956	0.616
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.576	0.372
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.532	0.988

TABLE - SLS10

10:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	27.138	17.509		144.8	KNOWN	129.8
2	81	6	7	0	20.0	35.555	22.939	KNOWN	143.3		123.3
3	81	8	0	0	20.0	8.897	5.740	KNOWN	143.3		123.3
4	9	0	0	0	20.0	20.284	13.087	KNOWN	142.7		122.7
5	8	9	80	10	40.0	-1.501	-0.968	KNOWN	142.3		102.3
6	2	6	1	3	10.0	-7.643	-4.931	KNOWN	141.8		131.8
7	1	0	0	0	45.0	0.743	0.479	KNOWN	147.4		102.4
8	3	16	47	0	10.0	-4.208	-2.715	KNOWN	139.4		129.4
9	16	5	15	46	10.0	-4.410	-2.845	KNOWN	139.6		129.6
10	4	5	14	0	10.0	-1.841	-1.188	KNOWN	140.6		130.6
11	15	14	13	28	10.0	-3.017	-1.947	KNOWN	139.0		129.0
12	7	80	13	11	20.0	-2.847	-1.837	KNOWN	142.2		122.2
13	11	12	17	0	20.0	-2.661	-1.717	KNOWN	141.6		121.6
14	10	12	18	0	35.0	-1.129	-0.729	KNOWN	141.7		106.7
15	18	19	73	0	35.0	-2.151	-1.388	KNOWN	133.8		98.8
16	28	17	75	26	15.0	-1.950	-1.258	KNOWN	139.1		124.1
17	19	75	74	0	15.0	-1.362	-0.878	KNOWN	137.5		122.5
18	47	45	49	48	20.0	-2.367	-1.527	KNOWN	138.5		118.5
19	74	20	24	25	15.0	-0.836	-0.539	KNOWN	136.1		121.1
20	73	20	21	0	30.0	-2.661	-1.717	KNOWN	132.1		102.1
21	21	23	22	0	40.0	-2.924	-1.887	KNOWN	125.0		85.0
22	30	29	44	0	10.0	-3.729	-2.406	KNOWN	138.7		128.7
23	24	23	33	34	10.0	-1.826	-1.178	KNOWN	126.8		116.8
24	43	65	64	52	15.0	-0.480	-0.309	KNOWN	131.4		116.4
25	30	43	76	0	10.0	-0.603	-0.389	KNOWN	133.4		123.4
26	42	31	32	0	15.0	-1.934	-1.248	KNOWN	128.4		113.4
27	42	78	77	0	10.0	-0.340	-0.220	KNOWN	128.3		118.3
28	78	66	67	0	10.0	-0.526	-0.339	KNOWN	128.6		118.6
29	65	66	63	71	15.0	-0.464	-0.299	KNOWN	130.3		115.3
30	76	31	82	0	10.0	-0.990	-0.639	KNOWN	131.6		121.6
31	25	82	27	0	10.0	-0.727	-0.469	KNOWN	136.2		126.2
32	26	29	27	0	10.0	-2.135	-1.378	KNOWN	138.8		128.8
33	64	63	62	0	20.0	-1.965	-1.268	KNOWN	130.9		110.9
34	62	60	61	0	20.0	-1.238	-0.799	KNOWN	131.6		111.6
35	71	60	59	0	10.0	-1.238	-0.799	KNOWN	130.9		120.9
36	59	58	57	0	10.0	-1.238	-0.799	KNOWN	131.7		121.7
37	61	58	56	0	15.0	-1.795	-1.158	KNOWN	132.3		117.3
38	56	55	53	0	15.0	-1.238	-0.799	KNOWN	133.1		118.1
39	57	55	54	0	15.0	-1.238	-0.799	KNOWN	133.1		118.1
40	52	53	51	0	20.0	-2.151	-1.388	KNOWN	133.7		113.7
41	45	51	50	0	35.0	-1.238	-0.799	KNOWN	137.5		102.5
42	49	54	50	0	15.0	-1.238	-0.799	KNOWN	135.5		120.5
43	77	67	68	0	10.0	-0.526	-0.339	KNOWN	127.6		117.6
44	41	69	0	0	15.0	-2.986	-1.927	KNOWN	126.5		111.5
45	41	40	39	0	15.0	-0.913	-0.589	KNOWN	126.5		111.5
46	33	32	40	38	20.0	-0.990	-0.639	KNOWN	126.5		106.5
47	39	72	37	0	60.0	-1.052	-0.679	KNOWN	124.5		64.5
48	72	35	0	0	25.0	-1.996	-1.288	KNOWN	122.2		97.2
49	46	48	44	0	20.0	-4.549	-2.935	KNOWN	138.6		118.6
50	36	79	0	0	70.0	-1.609	-1.038	KNOWN	124.8		54.8
51	38	37	36	0	60.0	0.000	0.000	KNOWN	124.8		64.8
52	70	0	0	0	10.0	-1.609	-1.038	KNOWN	120.6		110.6
53	22	0	0	0	20.0	-2.739	-1.767	KNOWN	116.8		96.8
54	34	35	79	0	20.0	-1.083	-0.699	KNOWN	124.9		104.9
55	68	69	70	0	10.0	-0.727	-0.469	KNOWN	126.9		116.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	27.094	17.480
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.031	1.956
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	17.840	11.510
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	20.747	13.385
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	5.865	3.784
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	20.284	13.087
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.443	0.286
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	24.206	15.617
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.740	0.477
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.155	7.842
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	25.923	16.724
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.479	0.309
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.425	5.436
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	22.400	14.452
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.307	0.198
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	17.205	11.100
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.681	1.085
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.676	0.436
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.353	0.228
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	17.666	11.398
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	16.790	10.832
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	31.795	20.513
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	6.286	4.056
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.355	0.874
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	5.491	3.542
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	12.433	8.021
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	17.060	11.007
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	9.716	6.268
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	20.528	13.244
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.099	0.709
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	15.569	10.045
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.499	0.967
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.574	4.887
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.193	0.124
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	4.328	2.792
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.334	0.861
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	2.739	1.767
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.689	3.670
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	12.331	7.955
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.913	1.879
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.120	1.368
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.294	1.480
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.237	0.798
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.602	0.388
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	6.191	3.994
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	6.035	3.894
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.848	2.483
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.126	0.081
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.532	2.924
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.472	1.595
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.202	0.776
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.988	0.637
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.346	4.739
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.618	3.624
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	6.537	4.218
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.671	0.433
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.674	1.080
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.594	1.674
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	2.312	1.491
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.856	0.552
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	4.405	2.842
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.053	0.679
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.932	0.601
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.359	0.877
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	7.132	4.601
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.094	0.060
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	8.463	5.460
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.503	1.615
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	16.649	10.741
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.641	1.704
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.079	3.922
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.757	0.488
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.743	2.415
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.241	0.801
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.085	0.700
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.361	1.523
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.376	0.888
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.344	0.867
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.619	0.400
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.017	0.656
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.592	0.382
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.609	1.038

TABLE - SLS11

11:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.593	18.447		142.0	KNOWN	127.0
2	81	6	7	0	20.0	36.298	23.418	KNOWN	140.2		120.2
3	81	8	0	0	20.0	8.850	5.710	KNOWN	140.2		120.2
4	9	0	0	0	20.0	21.042	13.576	KNOWN	139.7		119.7
5	8	9	80	10	40.0	-1.547	-0.998	KNOWN	139.2		99.2
6	2	6	1	3	10.0	-8.092	-5.221	KNOWN	138.7		128.7
7	1	0	0	0	45.0	0.603	0.389	KNOWN	142.5		97.5
8	3	16	47	0	10.0	-4.611	-2.975	KNOWN	136.2		126.2
9	16	5	15	46	10.0	-4.843	-3.124	KNOWN	136.4		126.4
10	4	5	14	0	10.0	-1.779	-1.148	KNOWN	137.5		127.5
11	15	14	13	28	10.0	-3.110	-2.006	KNOWN	135.8		125.8
12	7	80	13	11	20.0	-2.924	-1.887	KNOWN	139.1		119.1
13	11	12	17	0	20.0	-2.754	-1.777	KNOWN	138.4		118.4
14	10	12	18	0	35.0	-1.160	-0.749	KNOWN	138.6		103.6
15	18	19	73	0	35.0	-2.120	-1.368	KNOWN	130.4		95.4
16	28	17	75	26	15.0	-2.027	-1.308	KNOWN	135.9		120.9
17	19	75	74	0	15.0	-1.408	-0.908	KNOWN	134.2		119.2
18	47	45	49	48	20.0	-2.429	-1.567	KNOWN	135.2		115.2
19	74	20	24	25	15.0	-0.836	-0.539	KNOWN	132.8		117.8
20	73	20	21	0	30.0	-2.754	-1.777	KNOWN	128.6		98.6
21	21	23	22	0	40.0	-3.079	-1.986	KNOWN	121.1		81.1
22	30	29	44	0	10.0	-3.853	-2.486	KNOWN	135.4		125.4
23	24	23	33	34	10.0	-1.919	-1.238	KNOWN	123.3		113.3
24	43	65	64	52	15.0	-0.495	-0.319	KNOWN	128.0		113.0
25	30	43	76	0	10.0	-0.619	-0.399	KNOWN	130.1		120.1
26	42	31	32	0	15.0	-1.903	-1.228	KNOWN	125.0		110.0
27	42	78	77	0	10.0	-0.325	-0.210	KNOWN	124.9		114.9
28	78	66	67	0	10.0	-0.511	-0.329	KNOWN	125.2		115.2
29	65	66	63	71	15.0	-0.480	-0.309	KNOWN	126.9		111.9
30	76	31	82	0	10.0	-1.037	-0.669	KNOWN	128.2		118.2
31	25	82	27	0	10.0	-0.758	-0.489	KNOWN	132.9		122.9
32	26	29	27	0	10.0	-2.197	-1.417	KNOWN	135.6		125.6
33	64	63	62	0	20.0	-2.027	-1.308	KNOWN	127.5		107.5
34	62	60	61	0	20.0	-1.269	-0.819	KNOWN	128.1		108.1
35	71	60	59	0	10.0	-1.269	-0.819	KNOWN	127.4		117.4
36	59	58	57	0	10.0	-1.269	-0.819	KNOWN	128.2		118.2
37	61	58	56	0	15.0	-1.826	-1.178	KNOWN	128.9		113.9
38	56	55	53	0	15.0	-1.269	-0.819	KNOWN	129.7		114.7
39	57	55	54	0	15.0	-1.269	-0.819	KNOWN	129.7		114.7
40	52	53	51	0	20.0	-2.197	-1.417	KNOWN	130.3		110.3
41	45	51	50	0	35.0	-1.269	-0.819	KNOWN	134.2		99.2
42	49	54	50	0	15.0	-1.269	-0.819	KNOWN	132.1		117.1
43	77	67	68	0	10.0	-0.511	-0.329	KNOWN	124.2		114.2
44	41	69	0	0	15.0	-2.955	-1.907	KNOWN	123.1		108.1
45	41	40	39	0	15.0	-0.913	-0.589	KNOWN	123.0		108.0
46	33	32	40	38	20.0	-0.990	-0.639	KNOWN	123.0		103.0
47	39	72	37	0	60.0	-1.052	-0.679	KNOWN	121.1		61.1
48	72	35	0	0	25.0	-1.980	-1.278	KNOWN	118.8		93.8
49	46	48	44	0	20.0	-4.657	-3.005	KNOWN	135.4		115.4
50	36	79	0	0	70.0	-1.578	-1.018	KNOWN	121.3		51.3
51	38	37	36	0	60.0	0.000	0.000	KNOWN	121.4		61.4
52	70	0	0	0	10.0	-1.578	-1.018	KNOWN	117.4		107.4
53	22	0	0	0	20.0	-2.893	-1.867	KNOWN	111.9		91.9
54	34	35	79	0	20.0	-1.068	-0.689	KNOWN	121.4		101.4
55	68	69	70	0	10.0	-0.712	-0.459	KNOWN	123.5		113.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.556	18.423
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.888	1.863
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	18.107	11.682
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	21.103	13.615
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	5.905	3.810
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.042	13.576
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.488	0.315
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	24.913	16.073
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.603	0.389
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.566	8.107
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	26.647	17.192
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.513	0.331
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.468	5.463
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	23.143	14.931
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.310	0.200
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	17.477	11.275
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.724	1.112
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.693	0.447
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.382	0.246
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	17.953	11.583
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	17.336	11.185
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	32.585	21.023
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	6.416	4.140
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.382	0.891
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	5.678	3.663
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	12.635	8.152
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	17.540	11.316
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	9.846	6.352
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	20.842	13.447
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.117	0.721
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	15.920	10.271
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.540	0.994
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.653	4.937
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.183	0.118
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	4.465	2.880
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.508	0.973
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	2.893	1.867
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.759	3.715
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	12.710	8.200
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	3.092	1.995
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	1.971	1.271
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.256	1.456
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.257	0.811
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.604	0.390
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	6.247	4.031
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	6.090	3.929
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.883	2.505
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.133	0.086
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.538	2.928
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.501	1.614
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.185	0.764
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.993	0.641
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.311	4.717
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.616	3.623
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	6.530	4.213
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.657	0.424
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.691	1.091
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.633	1.698
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	2.309	1.490
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.867	0.559
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	4.445	2.868
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.058	0.683
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.948	0.612
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.379	0.890
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	7.219	4.658
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.113	0.073
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	8.601	5.549
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.534	1.635
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	16.888	10.896
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.685	1.733
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.098	3.934
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.853	0.550
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.808	2.457
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.139	0.735
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.079	0.696
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.343	1.512
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.366	0.881
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.339	0.864
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.615	0.397
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.004	0.648
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.574	0.370
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.578	1.018

TABLE - SLS12

12:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	27.927	18.018		143.5	KNOWN	128.5
2	81	6	7	0	20.0	37.845	24.416	KNOWN	142.0		122.0
3	81	8	0	0	20.0	8.835	5.700	KNOWN	142.0		122.0
4	9	0	0	0	20.0	21.027	13.566	KNOWN	141.3		121.3
5	8	9	80	10	40.0	-1.594	-1.028	KNOWN	140.9		100.9
6	2	6	1	3	10.0	-8.510	-5.490	KNOWN	140.3		130.3
7	1	0	0	0	45.0	0.758	0.489	KNOWN	146.2		101.2
8	3	16	47	0	10.0	-4.147	-2.675	KNOWN	137.8		127.8
9	16	5	15	46	10.0	-4.348	-2.805	KNOWN	138.0		128.0
10	4	5	14	0	10.0	-1.857	-1.198	KNOWN	139.1		129.1
11	15	14	13	28	10.0	-3.187	-2.056	KNOWN	137.4		127.4
12	7	80	13	11	20.0	-2.986	-1.927	KNOWN	140.8		120.8
13	11	12	17	0	20.0	-2.800	-1.807	KNOWN	140.1		120.1
14	10	12	18	0	35.0	-1.191	-0.769	KNOWN	140.3		105.3
15	18	19	73	0	35.0	-2.120	-1.368	KNOWN	131.8		96.8
16	28	17	75	26	15.0	-2.058	-1.328	KNOWN	137.5		122.5
17	19	75	74	0	15.0	-1.439	-0.928	KNOWN	135.7		120.7
18	47	45	49	48	20.0	-2.491	-1.607	KNOWN	136.8		116.8
19	74	20	24	25	15.0	-0.820	-0.529	KNOWN	134.4		119.4
20	73	20	21	0	30.0	-2.800	-1.807	KNOWN	129.9		99.9
21	21	23	22	0	40.0	-3.249	-2.096	KNOWN	122.0		82.0
22	30	29	44	0	10.0	-3.930	-2.535	KNOWN	137.0		127.0
23	24	23	33	34	10.0	-2.027	-1.308	KNOWN	124.7		114.7
24	43	65	64	52	15.0	-0.511	-0.329	KNOWN	129.4		114.4
25	30	43	76	0	10.0	-0.634	-0.409	KNOWN	131.5		121.5
26	42	31	32	0	15.0	-1.888	-1.218	KNOWN	126.4		111.4
27	42	78	77	0	10.0	-0.325	-0.210	KNOWN	126.3		116.3
28	78	66	67	0	10.0	-0.511	-0.329	KNOWN	126.6		116.6
29	65	66	63	71	15.0	-0.495	-0.319	KNOWN	128.2		113.2
30	76	31	82	0	10.0	-1.052	-0.679	KNOWN	129.7		119.7
31	25	82	27	0	10.0	-0.758	-0.489	KNOWN	134.4		124.4
32	26	29	27	0	10.0	-2.243	-1.447	KNOWN	137.2		127.2
33	64	63	62	0	20.0	-2.073	-1.338	KNOWN	128.9		108.9
34	62	60	61	0	20.0	-1.315	-0.848	KNOWN	129.5		109.5
35	71	60	59	0	10.0	-1.315	-0.848	KNOWN	128.7		118.7
36	59	58	57	0	10.0	-1.315	-0.848	KNOWN	129.5		119.5
37	61	58	56	0	15.0	-1.888	-1.218	KNOWN	130.3		115.3
38	56	55	53	0	15.0	-1.315	-0.848	KNOWN	131.1		116.1
39	57	55	54	0	15.0	-1.315	-0.848	KNOWN	131.1		116.1
40	52	53	51	0	20.0	-2.259	-1.457	KNOWN	131.7		111.7
41	45	51	50	0	35.0	-1.315	-0.848	KNOWN	135.8		100.8
42	49	54	50	0	15.0	-1.315	-0.848	KNOWN	133.6		118.6
43	77	67	68	0	10.0	-0.511	-0.329	KNOWN	125.6		115.6
44	41	69	0	0	15.0	-2.909	-1.877	KNOWN	124.4		109.4
45	41	40	39	0	15.0	-0.897	-0.579	KNOWN	124.4		109.4
46	33	32	40	38	20.0	-0.975	-0.629	KNOWN	124.4		104.4
47	39	72	37	0	60.0	-1.037	-0.669	KNOWN	122.5		62.5
48	72	35	0	0	25.0	-1.950	-1.258	KNOWN	120.3		95.3
49	46	48	44	0	20.0	-4.796	-3.094	KNOWN	137.0		117.0
50	36	79	0	0	70.0	-1.563	-1.008	KNOWN	122.8		52.8
51	38	37	36	0	60.0	0.000	0.000	KNOWN	122.8		62.8
52	70	0	0	0	10.0	-1.563	-1.008	KNOWN	118.9		108.9
53	22	0	0	0	20.0	-3.048	-1.966	KNOWN	111.9		91.9
54	34	35	79	0	20.0	-1.052	-0.679	KNOWN	122.8		102.8
55	68	69	70	0	10.0	-0.696	-0.449	KNOWN	124.8		114.8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	27.919	18.012
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.703	1.744
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	18.900	12.194
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	21.647	13.966
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.132	3.956
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.027	13.566
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.448	0.289
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	25.117	16.205
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.758	0.489
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.462	8.040
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	26.614	17.170
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.482	0.311
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.797	5.676
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	23.013	14.847
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.324	0.209
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	17.860	11.523
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.744	1.125
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.704	0.454
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.415	0.268
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	18.405	11.874
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	17.393	11.222
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	32.998	21.289
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	6.533	4.215
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.415	0.913
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	5.828	3.760
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	12.806	8.262
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	17.718	11.431
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	9.952	6.421
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	21.276	13.727
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.143	0.737
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	16.113	10.395
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.586	1.023
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.741	4.994
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.195	0.126
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	4.614	2.977
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.683	1.086
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.048	1.966
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.833	3.763
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	12.812	8.266
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	3.049	1.967
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	1.816	1.172
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.214	1.429
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.288	0.831
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.607	0.392
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	6.319	4.077
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	6.149	3.967
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.911	2.523
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.158	0.102
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.569	2.948
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.524	1.628
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.164	0.751
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.996	0.643
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.275	4.694
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.601	3.613
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	6.532	4.214
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.631	0.407
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.710	1.103
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.663	1.718
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	2.286	1.475
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.883	0.570
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	4.485	2.893
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.063	0.686
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.971	0.626
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.407	0.908
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	7.343	4.738
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.146	0.094
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	8.804	5.680
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.576	1.662
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	17.212	11.105
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.749	1.773
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.087	3.927
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.919	0.593
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.828	2.469
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.046	0.675
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.067	0.689
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.319	1.496
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.345	0.868
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.314	0.848
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.604	0.390
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.005	0.648
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.558	0.360
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.563	1.008

TABLE - SLS13

13:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.670	18.497		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.346	25.385	KNOWN	140.4		120.4
3	81	8	0	0	20.0	8.788	5.670	KNOWN	140.4		120.4
4	9	0	0	0	20.0	21.460	13.845	KNOWN	139.7		119.7
5	8	9	80	10	40.0	-1.656	-1.068	KNOWN	139.3		99.3
6	2	6	1	3	10.0	-8.726	-5.630	KNOWN	138.7		128.7
7	1	0	0	0	45.0	0.542	0.349	KNOWN	141.8		96.8
8	3	16	47	0	10.0	-4.301	-2.775	KNOWN	136.1		126.1
9	16	5	15	46	10.0	-4.533	-2.925	KNOWN	136.3		126.3
10	4	5	14	0	10.0	-1.686	-1.088	KNOWN	137.4		127.4
11	15	14	13	28	10.0	-3.311	-2.136	KNOWN	135.6		125.6
12	7	80	13	11	20.0	-3.125	-2.016	KNOWN	139.2		119.2
13	11	12	17	0	20.0	-2.924	-1.887	KNOWN	138.4		118.4
14	10	12	18	0	35.0	-1.222	-0.789	KNOWN	138.6		103.6
15	18	19	73	0	35.0	-1.996	-1.288	KNOWN	129.9		94.9
16	28	17	75	26	15.0	-2.135	-1.378	KNOWN	135.7		120.7
17	19	75	74	0	15.0	-1.501	-0.968	KNOWN	133.9		118.9
18	47	45	49	48	20.0	-2.553	-1.647	KNOWN	135.0		115.0
19	74	20	24	25	15.0	-0.820	-0.529	KNOWN	132.5		117.5
20	73	20	21	0	30.0	-2.924	-1.887	KNOWN	127.9		97.9
21	21	23	22	0	40.0	-3.327	-2.146	KNOWN	119.6		79.6
22	30	29	44	0	10.0	-4.085	-2.635	KNOWN	135.2		125.2
23	24	23	33	34	10.0	-2.073	-1.338	KNOWN	122.4		112.4
24	43	65	64	52	15.0	-0.526	-0.339	KNOWN	127.2		112.2
25	30	43	76	0	10.0	-0.665	-0.429	KNOWN	129.5		119.5
26	42	31	32	0	15.0	-1.919	-1.238	KNOWN	124.2		109.2
27	42	78	77	0	10.0	-0.340	-0.220	KNOWN	124.1		114.1
28	78	66	67	0	10.0	-0.511	-0.329	KNOWN	124.4		114.4
29	65	66	63	71	15.0	-0.511	-0.329	KNOWN	126.1		111.1
30	76	31	82	0	10.0	-1.099	-0.709	KNOWN	127.6		117.6
31	25	82	27	0	10.0	-0.789	-0.509	KNOWN	132.5		122.5
32	26	29	27	0	10.0	-2.336	-1.507	KNOWN	135.4		125.4
33	64	63	62	0	20.0	-2.120	-1.368	KNOWN	126.7		106.7
34	62	60	61	0	20.0	-1.346	-0.868	KNOWN	127.4		107.4
35	71	60	59	0	10.0	-1.346	-0.868	KNOWN	126.6		116.6
36	59	58	57	0	10.0	-1.346	-0.868	KNOWN	127.4		117.4
37	61	58	56	0	15.0	-1.919	-1.238	KNOWN	128.2		113.2
38	56	55	53	0	15.0	-1.346	-0.868	KNOWN	129.1		114.1
39	57	55	54	0	15.0	-1.346	-0.868	KNOWN	129.1		114.1
40	52	53	51	0	20.0	-2.321	-1.497	KNOWN	129.7		109.7
41	45	51	50	0	35.0	-1.346	-0.868	KNOWN	133.9		98.9
42	49	54	50	0	15.0	-1.346	-0.868	KNOWN	131.7		116.7
43	77	67	68	0	10.0	-0.511	-0.329	KNOWN	123.4		113.4
44	41	69	0	0	15.0	-2.971	-1.917	KNOWN	122.2		107.2
45	41	40	39	0	15.0	-0.913	-0.589	KNOWN	122.1		107.1
46	33	32	40	38	20.0	-0.990	-0.639	KNOWN	122.1		102.1
47	39	72	37	0	60.0	-1.052	-0.679	KNOWN	120.1		60.1
48	72	35	0	0	25.0	-1.980	-1.278	KNOWN	117.9		92.9
49	46	48	44	0	20.0	-4.920	-3.174	KNOWN	135.2		115.2
50	36	79	0	0	70.0	-1.594	-1.028	KNOWN	120.4		50.4
51	38	37	36	0	60.0	0.000	0.000	KNOWN	120.5		60.5
52	70	0	0	0	10.0	-1.594	-1.028	KNOWN	116.4		106.4
53	22	0	0	0	20.0	-3.110	-2.006	KNOWN	109.1		89.1
54	34	35	79	0	20.0	-1.083	-0.699	KNOWN	120.5		100.5
55	68	69	70	0	10.0	-0.712	-0.459	KNOWN	122.6		112.6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.647	18.482
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.451	1.582
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	19.481	12.569
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	22.316	14.398
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.337	4.088
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.460	13.845
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.448	0.289
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	25.694	16.577
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.540	0.349
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.791	8.252
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	27.176	17.533
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.502	0.324
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.991	5.801
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	23.690	15.284
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.335	0.216
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	18.319	11.819
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.800	1.161
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.724	0.467
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.452	0.292
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	18.914	12.203
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	17.849	11.516
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	33.839	21.832
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	6.622	4.272
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.419	0.915
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	6.045	3.900
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	13.066	8.430
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	18.186	11.733
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	10.146	6.546
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	21.746	14.029
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.168	0.754
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	16.475	10.629
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.605	1.035
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.901	5.098
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.180	0.116
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	4.725	3.049
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.711	1.104
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.110	2.006
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.969	3.851
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	13.130	8.471
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	3.076	1.985
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	1.858	1.199
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.259	1.457
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.310	0.845
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.619	0.399
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	6.443	4.157
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	6.278	4.051
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.994	2.577
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.160	0.103
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.646	2.997
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.568	1.657
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.192	0.769
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	1.012	0.653
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.485	4.778
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.702	3.679
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	6.656	4.294
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.641	0.413
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.751	1.129
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.720	1.755
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	2.333	1.505
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.902	0.582
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	4.581	2.955
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.085	0.700
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.993	0.641
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.437	0.927
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	7.493	4.834
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.152	0.098
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	8.991	5.801
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.632	1.698
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	17.590	11.348
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.810	1.813
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.204	4.002
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.928	0.599
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.898	2.515
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.072	0.691
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.087	0.701
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.364	1.525
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.367	0.882
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.332	0.859
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.614	0.396
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.031	0.665
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.562	0.363
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.594	1.028

TABLE - SLS14

14:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.686	18.507		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.315	25.365	KNOWN	140.4		120.4
3	81	8	0	0	20.0	8.742	5.640	KNOWN	140.4		120.4
4	9	0	0	0	20.0	21.754	14.035	KNOWN	139.7		119.7
5	8	9	80	10	40.0	-1.717	-1.108	KNOWN	139.3		99.3
6	2	6	1	3	10.0	-8.726	-5.630	KNOWN	138.7		128.7
7	1	0	0	0	45.0	0.696	0.449	KNOWN	143.5		98.5
8	3	16	47	0	10.0	-4.301	-2.775	KNOWN	136.0		126.0
9	16	5	15	46	10.0	-4.533	-2.925	KNOWN	136.3		126.3
10	4	5	14	0	10.0	-1.686	-1.088	KNOWN	137.4		127.4
11	15	14	13	28	10.0	-3.419	-2.206	KNOWN	135.5		125.5
12	7	80	13	11	20.0	-3.218	-2.076	KNOWN	139.1		119.1
13	11	12	17	0	20.0	-3.033	-1.956	KNOWN	138.4		118.4
14	10	12	18	0	35.0	-1.191	-0.769	KNOWN	138.6		103.6
15	18	19	73	0	35.0	-1.950	-1.258	KNOWN	129.8		94.8
16	28	17	75	26	15.0	-2.213	-1.427	KNOWN	135.7		120.7
17	19	75	74	0	15.0	-1.547	-0.998	KNOWN	133.8		118.8
18	47	45	49	48	20.0	-2.491	-1.607	KNOWN	135.0		115.0
19	74	20	24	25	15.0	-0.836	-0.539	KNOWN	132.4		117.4
20	73	20	21	0	30.0	-3.033	-1.956	KNOWN	127.7		97.7
21	21	23	22	0	40.0	-3.327	-2.146	KNOWN	119.5		79.5
22	30	29	44	0	10.0	-4.224	-2.725	KNOWN	135.2		125.2
23	24	23	33	34	10.0	-2.073	-1.338	KNOWN	122.3		112.3
24	43	65	64	52	15.0	-0.511	-0.329	KNOWN	127.3		112.3
25	30	43	76	0	10.0	-0.681	-0.439	KNOWN	129.4		119.4
26	42	31	32	0	15.0	-1.934	-1.248	KNOWN	124.1		109.1
27	42	78	77	0	10.0	-0.340	-0.220	KNOWN	124.1		114.1
28	78	66	67	0	10.0	-0.511	-0.329	KNOWN	124.4		114.4
29	65	66	63	71	15.0	-0.495	-0.319	KNOWN	126.1		111.1
30	76	31	82	0	10.0	-1.129	-0.729	KNOWN	127.5		117.5
31	25	82	27	0	10.0	-0.820	-0.529	KNOWN	132.4		122.4
32	26	29	27	0	10.0	-2.414	-1.557	KNOWN	135.4		125.4
33	64	63	62	0	20.0	-2.073	-1.338	KNOWN	126.8		106.8
34	62	60	61	0	20.0	-1.315	-0.848	KNOWN	127.5		107.5
35	71	60	59	0	10.0	-1.315	-0.848	KNOWN	126.7		116.7
36	59	58	57	0	10.0	-1.315	-0.848	KNOWN	127.5		117.5
37	61	58	56	0	15.0	-1.888	-1.218	KNOWN	128.3		113.3
38	56	55	53	0	15.0	-1.315	-0.848	KNOWN	129.2		114.2
39	57	55	54	0	15.0	-1.315	-0.848	KNOWN	129.2		114.2
40	52	53	51	0	20.0	-2.259	-1.457	KNOWN	129.8		109.8
41	45	51	50	0	35.0	-1.315	-0.848	KNOWN	133.9		98.9
42	49	54	50	0	15.0	-1.315	-0.848	KNOWN	131.7		116.7
43	77	67	68	0	10.0	-0.511	-0.329	KNOWN	123.3		113.3
44	41	69	0	0	15.0	-3.002	-1.937	KNOWN	122.1		107.1
45	41	40	39	0	15.0	-0.928	-0.599	KNOWN	122.0		107.0
46	33	32	40	38	20.0	-1.006	-0.649	KNOWN	122.1		102.1
47	39	72	37	0	60.0	-1.068	-0.689	KNOWN	120.0		60.0
48	72	35	0	0	25.0	-1.996	-1.288	KNOWN	117.8		92.8
49	46	48	44	0	20.0	-4.812	-3.104	KNOWN	135.2		115.2
50	36	79	0	0	70.0	-1.594	-1.028	KNOWN	120.3		50.3
51	38	37	36	0	60.0	0.000	0.000	KNOWN	120.4		60.4
52	70	0	0	0	10.0	-1.594	-1.028	KNOWN	116.4		106.4
53	22	0	0	0	20.0	-3.110	-2.006	KNOWN	109.0		89.0
54	34	35	79	0	20.0	-1.083	-0.699	KNOWN	120.4		100.4
55	68	69	70	0	10.0	-0.712	-0.459	KNOWN	122.5		112.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.686	18.507
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.428	1.567
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	19.379	12.502
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	22.365	14.429
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.313	4.073
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.752	14.034
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.475	0.306
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	25.874	16.693
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.681	0.439
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.800	8.258
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	27.234	17.570
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.496	0.320
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.995	5.803
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	23.720	15.303
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.349	0.225
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	18.341	11.833
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.828	1.179
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.728	0.470
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.511	0.330
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	18.894	12.190
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	18.032	11.633
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	33.894	21.867
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	6.651	4.291
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.426	0.920
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	6.127	3.953
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	13.157	8.488
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	18.009	11.618
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	10.184	6.571
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	21.531	13.891
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.155	0.745
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	16.181	10.439
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.619	1.045
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.903	5.099
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.173	0.112
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	4.714	3.041
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.723	1.111
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.110	2.006
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.976	3.856
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	12.852	8.292
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.626	1.694
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	1.840	1.187
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.267	1.463
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.276	0.824
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.622	0.402
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	6.430	4.149
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	6.287	4.056
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	4.019	2.593
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.115	0.074
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.637	2.992
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.583	1.666
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.237	0.798
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	1.017	0.656
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.532	4.859
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.784	3.731
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	6.732	4.343
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.672	0.434
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.748	1.128
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.741	1.769
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	2.375	1.532
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.897	0.578
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	4.587	2.959
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.091	0.704
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.981	0.633
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.425	0.920
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	7.456	4.810
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.122	0.079
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	8.895	5.739
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.616	1.688
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	17.440	11.252
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.776	1.791
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.291	4.058
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.983	0.634
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.985	2.571
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.039	0.670
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.095	0.706
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.378	1.534
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.377	0.888
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.350	0.871
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.619	0.399
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.028	0.663
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.565	0.365
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.594	1.028

TABLE - SLS15

15:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	26.504	17.099		146.0	KNOWN	131.0
2	81	6	7	0	20.0	39.346	25.385	KNOWN	144.8		124.8
3	81	8	0	0	20.0	8.309	5.360	KNOWN	144.8		124.8
4	9	0	0	0	20.0	20.222	13.047	KNOWN	144.0		124.0
5	8	9	80	10	40.0	-1.686	-1.088	KNOWN	143.6		103.6
6	2	6	1	3	10.0	-7.984	-5.151	KNOWN	143.1		133.1
7	1	0	0	0	45.0	1.253	0.809	KNOWN	158.0		113.0
8	3	16	47	0	10.0	-3.172	-2.046	KNOWN	140.7		130.7
9	16	5	15	46	10.0	-3.342	-2.156	KNOWN	140.9		130.9
10	4	5	14	0	10.0	-1.888	-1.218	KNOWN	141.9		131.9
11	15	14	13	28	10.0	-3.373	-2.176	KNOWN	140.1		130.1
12	7	80	13	11	20.0	-3.156	-2.036	KNOWN	143.5		123.5
13	11	12	17	0	20.0	-2.955	-1.907	KNOWN	142.8		122.8
14	10	12	18	0	35.0	-1.253	-0.809	KNOWN	143.0		108.0
15	18	19	73	0	35.0	-1.903	-1.228	KNOWN	134.8		99.8
16	28	17	75	26	15.0	-2.182	-1.407	KNOWN	140.2		125.2
17	19	75	74	0	15.0	-1.532	-0.988	KNOWN	138.5		123.5
18	47	45	49	48	20.0	-2.615	-1.687	KNOWN	139.6		119.6
19	74	20	24	25	15.0	-0.805	-0.519	KNOWN	137.1		122.1
20	73	20	21	0	30.0	-2.955	-1.907	KNOWN	132.9		102.9
21	21	23	22	0	40.0	-3.033	-1.956	KNOWN	125.6		85.6
22	30	29	44	0	10.0	-4.162	-2.685	KNOWN	139.8		129.8
23	24	23	33	34	10.0	-1.903	-1.228	KNOWN	127.7		117.7
24	43	65	64	52	15.0	-0.542	-0.349	KNOWN	132.0		117.0
25	30	43	76	0	10.0	-0.665	-0.429	KNOWN	134.2		124.2
26	42	31	32	0	15.0	-1.872	-1.208	KNOWN	129.2		114.2
27	42	78	77	0	10.0	-0.325	-0.210	KNOWN	129.1		119.1
28	78	66	67	0	10.0	-0.495	-0.319	KNOWN	129.4		119.4
29	65	66	63	71	15.0	-0.526	-0.339	KNOWN	130.9		115.9
30	76	31	82	0	10.0	-1.114	-0.719	KNOWN	132.4		122.4
31	25	82	27	0	10.0	-0.805	-0.519	KNOWN	137.2		127.2
32	26	29	27	0	10.0	-2.367	-1.527	KNOWN	139.9		129.9
33	64	63	62	0	20.0	-2.166	-1.397	KNOWN	131.5		111.5
34	62	60	61	0	20.0	-1.377	-0.888	KNOWN	132.1		112.1
35	71	60	59	0	10.0	-1.377	-0.888	KNOWN	131.3		121.3
36	59	58	57	0	10.0	-1.377	-0.888	KNOWN	132.1		122.1
37	61	58	56	0	15.0	-1.965	-1.268	KNOWN	132.8		117.8
38	56	55	53	0	15.0	-1.377	-0.888	KNOWN	133.7		118.7
39	57	55	54	0	15.0	-1.377	-0.888	KNOWN	133.7		118.7
40	52	53	51	0	20.0	-2.367	-1.527	KNOWN	134.3		114.3
41	45	51	50	0	35.0	-1.377	-0.888	KNOWN	138.5		103.5
42	49	54	50	0	15.0	-1.377	-0.888	KNOWN	136.2		121.2
43	77	67	68	0	10.0	-0.495	-0.319	KNOWN	128.5		118.5
44	41	69	0	0	15.0	-2.893	-1.867	KNOWN	127.4		112.4
45	41	40	39	0	15.0	-0.882	-0.569	KNOWN	127.4		112.4
46	33	32	40	38	20.0	-0.959	-0.619	KNOWN	127.4		107.4
47	39	72	37	0	60.0	-1.021	-0.659	KNOWN	125.5		65.5
48	72	35	0	0	25.0	-1.934	-1.248	KNOWN	123.4		98.4
49	46	48	44	0	20.0	-5.028	-3.244	KNOWN	139.7		119.7
50	36	79	0	0	70.0	-1.547	-0.998	KNOWN	125.8		55.8
51	38	37	36	0	60.0	0.000	0.000	KNOWN	125.8		65.8
52	70	0	0	0	10.0	-1.547	-0.998	KNOWN	121.9		111.9
53	22	0	0	0	20.0	-2.847	-1.837	KNOWN	116.7		96.7
54	34	35	79	0	20.0	-1.037	-0.669	KNOWN	125.9		105.9
55	68	69	70	0	10.0	-0.696	-0.449	KNOWN	127.7		117.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	26.501	17.098
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	1.838	1.186
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	18.883	12.182
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	22.302	14.388
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.470	4.174
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	20.222	13.047
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.327	0.211
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	24.679	15.922
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	1.253	0.809
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.209	7.877
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	26.447	17.063
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.401	0.258
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	9.438	6.089
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	22.748	14.676
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.363	0.234
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	18.643	12.028
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.811	1.168
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.709	0.457
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.490	0.316
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	18.763	12.105
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	17.041	10.994
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	32.849	21.193
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	6.385	4.119
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.356	0.875
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	5.838	3.766
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	12.720	8.206
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	17.457	11.263
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	9.832	6.343
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	21.681	13.988
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.168	0.754
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	16.026	10.339
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.534	0.990
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.628	4.921
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.134	0.087
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	4.417	2.850
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.463	0.944
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	2.847	1.837
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.862	3.782
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	12.435	8.023
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.411	1.556
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.049	1.322
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.213	1.428
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.315	0.848
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.596	0.385
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	6.305	4.068
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	6.128	3.954
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.882	2.504
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.192	0.124
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.484	2.893
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.420	1.561
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.095	0.706
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.962	0.620
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	6.959	4.490
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.369	3.464
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	6.330	4.084
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.559	0.360
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.716	1.107
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.655	1.713
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	2.191	1.414
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.891	0.575
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	4.459	2.877
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.045	0.674
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.993	0.640
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.429	0.922
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	7.417	4.785
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.202	0.130
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	8.995	5.803
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.604	1.680
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	17.491	11.284
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.813	1.815
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	5.835	3.765
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.699	0.451
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.592	2.317
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.231	0.794
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.048	0.676
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.278	1.470
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.333	0.860
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.307	0.843
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.601	0.388
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.972	0.627
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.576	0.371
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.547	0.998

TABLE - SLS16

16:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	25.854	16.680		147.4	KNOWN	132.4
2	81	6	7	0	20.0	39.346	25.385	KNOWN	146.3		126.3
3	81	8	0	0	20.0	7.844	5.061	KNOWN	146.3		126.3
4	9	0	0	0	20.0	19.449	12.548	KNOWN	145.4		125.4
5	8	9	80	10	40.0	-1.686	-1.088	KNOWN	145.0		105.0
6	2	6	1	3	10.0	-7.736	-4.991	KNOWN	144.7		134.7
7	1	0	0	0	45.0	1.362	0.878	KNOWN	162.0		117.0
8	3	16	47	0	10.0	-2.785	-1.797	KNOWN	142.3		132.3
9	16	5	15	46	10.0	-2.924	-1.887	KNOWN	142.5		132.5
10	4	5	14	0	10.0	-1.779	-1.148	KNOWN	143.5		133.5
11	15	14	13	28	10.0	-3.373	-2.176	KNOWN	141.7		131.7
12	7	80	13	11	20.0	-3.172	-2.046	KNOWN	145.0		125.0
13	11	12	17	0	20.0	-2.971	-1.917	KNOWN	144.3		124.3
14	10	12	18	0	35.0	-1.269	-0.819	KNOWN	144.4		109.4
15	18	19	73	0	35.0	-1.733	-1.118	KNOWN	136.7		101.7
16	28	17	75	26	15.0	-2.182	-1.407	KNOWN	141.8		126.8
17	19	75	74	0	15.0	-1.532	-0.988	KNOWN	140.1		125.1
18	47	45	49	48	20.0	-2.646	-1.707	KNOWN	141.2		121.2
19	74	20	24	25	15.0	-0.774	-0.499	KNOWN	138.8		123.8
20	73	20	21	0	30.0	-2.971	-1.917	KNOWN	134.8		104.8
21	21	23	22	0	40.0	-2.955	-1.907	KNOWN	127.9		87.9
22	30	29	44	0	10.0	-4.162	-2.685	KNOWN	141.3		131.3
23	24	23	33	34	10.0	-1.841	-1.188	KNOWN	129.8		119.8
24	43	65	64	52	15.0	-0.542	-0.349	KNOWN	133.7		118.7
25	30	43	76	0	10.0	-0.665	-0.429	KNOWN	136.0		126.0
26	42	31	32	0	15.0	-1.795	-1.158	KNOWN	131.2		116.2
27	42	78	77	0	10.0	-0.309	-0.200	KNOWN	131.1		121.1
28	78	66	67	0	10.0	-0.480	-0.309	KNOWN	131.3		121.3
29	65	66	63	71	15.0	-0.526	-0.339	KNOWN	132.7		117.7
30	76	31	82	0	10.0	-1.114	-0.719	KNOWN	134.3		124.3
31	25	82	27	0	10.0	-0.805	-0.519	KNOWN	138.9		128.9
32	26	29	27	0	10.0	-2.367	-1.527	KNOWN	141.5		131.5
33	64	63	62	0	20.0	-2.197	-1.417	KNOWN	133.3		113.3
34	62	60	61	0	20.0	-1.393	-0.898	KNOWN	133.8		113.8
35	71	60	59	0	10.0	-1.393	-0.898	KNOWN	133.0		123.0
36	59	58	57	0	10.0	-1.393	-0.898	KNOWN	133.8		123.8
37	61	58	56	0	15.0	-1.996	-1.288	KNOWN	134.5		119.5
38	56	55	53	0	15.0	-1.393	-0.898	KNOWN	135.4		120.4
39	57	55	54	0	15.0	-1.393	-0.898	KNOWN	135.4		120.4
40	52	53	51	0	20.0	-2.414	-1.557	KNOWN	136.0		116.0
41	45	51	50	0	35.0	-1.393	-0.898	KNOWN	140.1		105.1
42	49	54	50	0	15.0	-1.393	-0.898	KNOWN	137.8		122.8
43	77	67	68	0	10.0	-0.480	-0.309	KNOWN	130.5		120.5
44	41	69	0	0	15.0	-2.785	-1.797	KNOWN	129.5		114.5
45	41	40	39	0	15.0	-0.851	-0.549	KNOWN	129.5		114.5
46	33	32	40	38	20.0	-0.928	-0.599	KNOWN	129.5		109.5
47	39	72	37	0	60.0	-0.990	-0.639	KNOWN	127.8		67.8
48	72	35	0	0	25.0	-1.857	-1.198	KNOWN	125.8		100.8
49	46	48	44	0	20.0	-5.106	-3.294	KNOWN	141.3		121.3
50	36	79	0	0	70.0	-1.485	-0.958	KNOWN	128.1		58.1
51	38	37	36	0	60.0	0.000	0.000	KNOWN	128.1		68.1
52	70	0	0	0	10.0	-1.485	-0.958	KNOWN	124.5		114.5
53	22	0	0	0	20.0	-2.770	-1.787	KNOWN	119.4		99.4
54	34	35	79	0	20.0	-1.006	-0.649	KNOWN	128.1		108.1
55	68	69	70	0	10.0	-0.665	-0.429	KNOWN	129.9		119.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	25.844	16.673
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	1.324	0.854
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	18.444	11.899
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	22.228	14.341
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.518	4.205
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	19.449	12.548
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.245	0.158
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	24.035	15.506
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	1.362	0.878
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	11.957	7.714
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	25.967	16.753
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.369	0.238
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	9.541	6.155
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	22.377	14.437
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.371	0.239
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	18.713	12.073
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.811	1.168
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.697	0.450
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.495	0.319
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	18.605	12.003
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	16.559	10.683
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	32.193	20.770
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	6.207	4.005
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.308	0.844
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	5.782	3.730
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	12.428	8.018
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	17.089	11.025
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	9.588	6.186
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	21.546	13.900
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.163	0.750
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	15.814	10.203
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.492	0.963
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.430	4.794
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.107	0.069
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	4.303	2.776
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.421	0.917
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	2.770	1.787
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.758	3.715
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	12.126	7.823
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.207	1.424
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.029	1.309
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.138	1.380
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.315	0.848
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.577	0.372
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	6.181	3.988
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	5.985	3.861
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.778	2.437
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.222	0.143
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.347	2.805
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.331	1.504
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.012	0.653
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	6.602	4.259
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.110	3.297
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	6.058	3.908
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.493	0.318
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.684	1.086
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.596	1.675
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	2.074	1.338
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.877	0.566
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	4.344	2.802
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.008	0.651
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.986	0.636
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.415	0.913
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	7.325	4.726
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.233	0.150
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	8.951	5.775
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.574	1.661
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	17.349	11.193
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.804	1.809
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	5.554	3.583
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.619	0.399
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.404	2.196
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.240	0.800
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.008	0.650
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.192	1.414
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.280	0.826
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.262	0.814
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.577	0.372
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.930	0.600
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.556	0.358
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.485	0.958

TABLE - SLS17

17:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	24.972	16.111		149.0	KNOWN	134.0
2	81	6	7	0	20.0	37.845	24.416	KNOWN	147.9		127.9
3	81	8	0	0	20.0	7.597	4.901	KNOWN	147.9		127.9
4	9	0	0	0	20.0	18.706	12.068	KNOWN	147.1		127.1
5	8	9	80	10	40.0	-1.594	-1.028	KNOWN	146.7		106.7
6	2	6	1	3	10.0	-7.705	-4.971	KNOWN	146.4		136.4
7	1	0	0	0	45.0	1.501	0.968	KNOWN	167.2		122.2
8	3	16	47	0	10.0	-2.862	-1.847	KNOWN	144.2		134.2
9	16	5	15	46	10.0	-3.002	-1.937	KNOWN	144.4		134.4
10	4	5	14	0	10.0	-1.377	-0.888	KNOWN	145.4		135.4
11	15	14	13	28	10.0	-3.203	-2.066	KNOWN	143.6		133.6
12	7	80	13	11	20.0	-3.017	-1.947	KNOWN	146.7		126.7
13	11	12	17	0	20.0	-2.831	-1.827	KNOWN	146.1		126.1
14	10	12	18	0	35.0	-1.222	-0.789	KNOWN	146.2		111.2
15	18	19	73	0	35.0	-1.919	-1.238	KNOWN	138.7		103.7
16	28	17	75	26	15.0	-2.073	-1.338	KNOWN	143.7		128.7
17	19	75	74	0	15.0	-1.439	-0.928	KNOWN	142.2		127.2
18	47	45	49	48	20.0	-2.584	-1.667	KNOWN	143.2		123.2
19	74	20	24	25	15.0	-0.727	-0.469	KNOWN	141.0		126.0
20	73	20	21	0	30.0	-2.831	-1.827	KNOWN	137.0		107.0
21	21	23	22	0	40.0	-2.940	-1.897	KNOWN	130.4		90.4
22	30	29	44	0	10.0	-3.945	-2.545	KNOWN	143.3		133.3
23	24	23	33	34	10.0	-1.841	-1.188	KNOWN	132.7		122.7
24	43	65	64	52	15.0	-0.542	-0.349	KNOWN	136.3		121.3
25	30	43	76	0	10.0	-0.634	-0.409	KNOWN	138.4		128.4
26	42	31	32	0	15.0	-1.686	-1.088	KNOWN	134.0		119.0
27	42	78	77	0	10.0	-0.294	-0.190	KNOWN	133.9		123.9
28	78	66	67	0	10.0	-0.449	-0.289	KNOWN	134.1		124.1
29	65	66	63	71	15.0	-0.511	-0.329	KNOWN	135.3		120.3
30	76	31	82	0	10.0	-1.052	-0.679	KNOWN	136.8		126.8
31	25	82	27	0	10.0	-0.774	-0.499	KNOWN	141.0		131.0
32	26	29	27	0	10.0	-2.259	-1.457	KNOWN	143.5		133.5
33	64	63	62	0	20.0	-2.151	-1.388	KNOWN	135.8		115.8
34	62	60	61	0	20.0	-1.346	-0.868	KNOWN	136.3		116.3
35	71	60	59	0	10.0	-1.346	-0.868	KNOWN	135.6		125.6
36	59	58	57	0	10.0	-1.346	-0.868	KNOWN	136.3		126.3
37	61	58	56	0	15.0	-1.950	-1.258	KNOWN	137.0		122.0
38	56	55	53	0	15.0	-1.346	-0.868	KNOWN	137.8		122.8
39	57	55	54	0	15.0	-1.346	-0.868	KNOWN	137.7		122.7
40	52	53	51	0	20.0	-2.352	-1.517	KNOWN	138.3		118.3
41	45	51	50	0	35.0	-1.346	-0.868	KNOWN	142.2		107.2
42	49	54	50	0	15.0	-1.346	-0.868	KNOWN	140.1		125.1
43	77	67	68	0	10.0	-0.449	-0.289	KNOWN	133.3		123.3
44	41	69	0	0	15.0	-2.615	-1.687	KNOWN	132.5		117.5
45	41	40	39	0	15.0	-0.805	-0.519	KNOWN	132.4		117.4
46	33	32	40	38	20.0	-0.866	-0.559	KNOWN	132.5		112.5
47	39	72	37	0	60.0	-0.913	-0.589	KNOWN	130.9		70.9
48	72	35	0	0	25.0	-1.733	-1.118	KNOWN	129.2		104.2
49	46	48	44	0	20.0	-4.967	-3.204	KNOWN	143.3		123.3
50	36	79	0	0	70.0	-1.393	-0.898	KNOWN	131.1		61.1
51	38	37	36	0	60.0	0.000	0.000	KNOWN	131.2		71.2
52	70	0	0	0	10.0	-1.393	-0.898	KNOWN	128.0		118.0
53	22	0	0	0	20.0	-2.754	-1.777	KNOWN	122.1		102.1
54	34	35	79	0	20.0	-0.928	-0.599	KNOWN	131.2		111.2
55	68	69	70	0	10.0	-0.619	-0.399	KNOWN	132.8		122.8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	24.951	16.097
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	1.305	0.842
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	17.725	11.436
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	21.425	13.823
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.292	4.059
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	18.706	12.068
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.225	0.145
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	23.179	14.954
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	1.502	0.969
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	11.596	7.481
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	24.897	16.062
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.386	0.249
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	9.120	5.884
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	21.776	14.049
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.352	0.227
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	18.037	11.637
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.743	1.125
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.669	0.432
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.439	0.283
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	17.964	11.590
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	15.849	10.225
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	30.982	19.988
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	6.108	3.940
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.320	0.852
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	5.509	3.554
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	11.982	7.730
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	16.488	10.637
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	9.222	5.950
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	20.757	13.392
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.121	0.723
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	15.342	9.898
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.491	0.962
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.121	4.594
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.117	0.075
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	4.169	2.690
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.525	0.984
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	2.745	1.771
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.515	3.558
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	11.732	7.569
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.272	1.466
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	1.776	1.146
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	1.979	1.277
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.277	0.824
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.549	0.354
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	5.920	3.819
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	5.734	3.699
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.603	2.325
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.232	0.150
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.158	2.683
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.240	1.445
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.942	0.608
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.880	0.568
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	6.229	4.018
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	4.838	3.121
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	5.736	3.701
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.454	0.293
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.607	1.037
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.497	1.611
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	1.967	1.269
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.839	0.542
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	4.152	2.679
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.961	0.620
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.947	0.611
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.360	0.878
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	7.048	4.547
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.229	0.148
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	8.623	5.563
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.477	1.598
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	16.709	10.780
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.703	1.744
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	5.269	3.399
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.643	0.415
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.258	2.102
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.102	0.711
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.941	0.607
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.047	1.321
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.195	0.771
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.167	0.753
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.538	0.347
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.880	0.568
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.512	0.331
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.393	0.898

TABLE - SLS18

18:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	24.168	15.592		150.0	KNOWN	135.0
2	81	6	7	0	20.0	36.329	23.438	KNOWN	148.9		128.9
3	81	8	0	0	20.0	7.489	4.831	KNOWN	148.9		128.9
4	9	0	0	0	20.0	17.963	11.589	KNOWN	148.2		128.2
5	8	9	80	10	40.0	-1.532	-0.988	KNOWN	147.9		107.9
6	2	6	1	3	10.0	-7.303	-4.712	KNOWN	147.6		137.6
7	1	0	0	0	45.0	1.501	0.968	KNOWN	168.3		123.3
8	3	16	47	0	10.0	-2.893	-1.867	KNOWN	145.5		135.5
9	16	5	15	46	10.0	-3.033	-1.956	KNOWN	145.6		135.6
10	4	5	14	0	10.0	-1.129	-0.729	KNOWN	146.6		136.6
11	15	14	13	28	10.0	-3.064	-1.976	KNOWN	145.0		135.0
12	7	80	13	11	20.0	-2.893	-1.867	KNOWN	147.8		127.8
13	11	12	17	0	20.0	-2.708	-1.747	KNOWN	147.2		127.2
14	10	12	18	0	35.0	-1.176	-0.759	KNOWN	147.3		112.3
15	18	19	73	0	35.0	-1.903	-1.228	KNOWN	140.3		105.3
16	28	17	75	26	15.0	-1.980	-1.278	KNOWN	145.0		130.0
17	19	75	74	0	15.0	-1.377	-0.888	KNOWN	143.6		128.6
18	47	45	49	48	20.0	-2.491	-1.607	KNOWN	144.5		124.5
19	74	20	24	25	15.0	-0.727	-0.469	KNOWN	142.4		127.4
20	73	20	21	0	30.0	-2.708	-1.747	KNOWN	138.7		108.7
21	21	23	22	0	40.0	-2.785	-1.797	KNOWN	132.6		92.6
22	30	29	44	0	10.0	-3.791	-2.446	KNOWN	144.6		134.6
23	24	23	33	34	10.0	-1.733	-1.118	KNOWN	134.5		124.5
24	43	65	64	52	15.0	-0.511	-0.329	KNOWN	137.9		122.9
25	30	43	76	0	10.0	-0.603	-0.389	KNOWN	140.0		130.0
26	42	31	32	0	15.0	-1.671	-1.078	KNOWN	135.8		120.8
27	42	78	77	0	10.0	-0.294	-0.190	KNOWN	135.7		125.7
28	78	66	67	0	10.0	-0.449	-0.289	KNOWN	135.8		125.8
29	65	66	63	71	15.0	-0.495	-0.319	KNOWN	137.1		122.1
30	76	31	82	0	10.0	-1.006	-0.649	KNOWN	138.4		128.4
31	25	82	27	0	10.0	-0.743	-0.479	KNOWN	142.5		132.5
32	26	29	27	0	10.0	-2.151	-1.388	KNOWN	144.8		134.8
33	64	63	62	0	20.0	-2.058	-1.328	KNOWN	137.5		117.5
34	62	60	61	0	20.0	-1.300	-0.838	KNOWN	138.0		118.0
35	71	60	59	0	10.0	-1.300	-0.838	KNOWN	137.3		127.3
36	59	58	57	0	10.0	-1.300	-0.838	KNOWN	138.0		128.0
37	61	58	56	0	15.0	-1.872	-1.208	KNOWN	138.6		123.6
38	56	55	53	0	15.0	-1.300	-0.838	KNOWN	139.4		124.4
39	57	55	54	0	15.0	-1.300	-0.838	KNOWN	139.4		124.4
40	52	53	51	0	20.0	-2.259	-1.457	KNOWN	139.9		119.9
41	45	51	50	0	35.0	-1.300	-0.838	KNOWN	143.6		108.6
42	49	54	50	0	15.0	-1.300	-0.838	KNOWN	141.6		126.6
43	77	67	68	0	10.0	-0.449	-0.289	KNOWN	135.1		125.1
44	41	69	0	0	15.0	-2.599	-1.677	KNOWN	134.3		119.3
45	41	40	39	0	15.0	-0.789	-0.509	KNOWN	134.2		119.2
46	33	32	40	38	20.0	-0.851	-0.549	KNOWN	134.3		114.3
47	39	72	37	0	60.0	-0.913	-0.589	KNOWN	132.8		72.8
48	72	35	0	0	25.0	-1.717	-1.108	KNOWN	131.1		106.1
49	46	48	44	0	20.0	-4.781	-3.084	KNOWN	144.6		124.6
50	36	79	0	0	70.0	-1.377	-0.888	KNOWN	133.0		63.0
51	38	37	36	0	60.0	0.000	0.000	KNOWN	133.0		73.0
52	70	0	0	0	10.0	-1.377	-0.888	KNOWN	129.9		119.9
53	22	0	0	0	20.0	-2.615	-1.687	KNOWN	125.0		105.0
54	34	35	79	0	20.0	-0.928	-0.599	KNOWN	133.0		113.0
55	68	69	70	0	10.0	-0.619	-0.399	KNOWN	134.5		124.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	24.162	15.589
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	1.387	0.895
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	16.991	10.962
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	20.724	13.370
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.102	3.937
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	17.963	11.589
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.197	0.127
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	22.337	14.411
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	1.501	0.968
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	11.291	7.285
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	24.066	15.526
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.393	0.254
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.791	5.671
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	21.247	13.708
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.338	0.218
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	17.484	11.280
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.689	1.090
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.645	0.416
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.391	0.253
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	17.382	11.214
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	15.253	9.841
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	29.928	19.308
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	5.908	3.811
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.277	0.824
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	5.281	3.407
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	11.629	7.503
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	15.927	10.276
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	8.975	5.790
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	20.118	12.979
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.086	0.701
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	14.904	9.616
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.433	0.925
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	6.935	4.474
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.121	0.078
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	4.007	2.585
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.393	0.899
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	2.615	1.687
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.358	3.457
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	11.350	7.323
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.201	1.420
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	1.836	1.185
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	1.973	1.273
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.238	0.798
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.538	0.347
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	5.772	3.724
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	5.584	3.602
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.517	2.269
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.219	0.141
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.075	2.629
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.185	1.410
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.938	0.605
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.863	0.557
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	6.149	3.967
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	4.762	3.072
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	5.648	3.644
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.458	0.296
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.563	1.009
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.427	1.566
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	1.933	1.247
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.818	0.528
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	4.051	2.613
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.940	0.607
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.919	0.593
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.321	0.852
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	6.842	4.414
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.216	0.140
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	8.358	5.392
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.404	1.551
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	16.201	10.452
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.618	1.689
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	5.177	3.340
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.581	0.375
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.181	2.052
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.141	0.736
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.933	0.602
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.029	1.309
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.184	0.764
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.164	0.751
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.534	0.344
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.865	0.558
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.512	0.330
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.377	0.888

TABLE - SLS19

19:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	24.013	15.492		150.5	KNOWN	135.5
2	81	6	7	0	20.0	34.813	22.460	KNOWN	149.3		129.3
3	81	8	0	0	20.0	6.761	4.362	KNOWN	149.3		129.3
4	9	0	0	0	20.0	17.205	11.100	KNOWN	148.6		128.6
5	8	9	80	10	40.0	-1.454	-0.938	KNOWN	148.3		108.3
6	2	6	1	3	10.0	-7.349	-4.742	KNOWN	148.1		138.1
7	1	0	0	0	45.0	1.315	0.848	KNOWN	164.4		119.4
8	3	16	47	0	10.0	-2.940	-1.897	KNOWN	146.2		136.2
9	16	5	15	46	10.0	-3.079	-1.986	KNOWN	146.3		136.3
10	4	5	14	0	10.0	-1.099	-0.709	KNOWN	147.2		137.2
11	15	14	13	28	10.0	-2.924	-1.887	KNOWN	145.7		135.7
12	7	80	13	11	20.0	-2.754	-1.777	KNOWN	148.3		128.3
13	11	12	17	0	20.0	-2.584	-1.667	KNOWN	147.8		127.8
14	10	12	18	0	35.0	-1.145	-0.739	KNOWN	147.9		112.9
15	18	19	73	0	35.0	-1.934	-1.248	KNOWN	141.2		106.2
16	28	17	75	26	15.0	-1.888	-1.218	KNOWN	145.8		130.8
17	19	75	74	0	15.0	-1.315	-0.848	KNOWN	144.4		129.4
18	47	45	49	48	20.0	-2.398	-1.547	KNOWN	145.3		125.3
19	74	20	24	25	15.0	-0.650	-0.419	KNOWN	143.4		128.4
20	73	20	21	0	30.0	-2.584	-1.667	KNOWN	139.8		109.8
21	21	23	22	0	40.0	-2.800	-1.807	KNOWN	134.1		94.1
22	30	29	44	0	10.0	-3.605	-2.326	KNOWN	145.4		135.4
23	24	23	33	34	10.0	-1.748	-1.128	KNOWN	136.4		126.4
24	43	65	64	52	15.0	-0.495	-0.319	KNOWN	139.4		124.4
25	30	43	76	0	10.0	-0.588	-0.379	KNOWN	141.2		131.2
26	42	31	32	0	15.0	-1.501	-0.968	KNOWN	137.5		122.5
27	42	78	77	0	10.0	-0.263	-0.170	KNOWN	137.4		127.4
28	78	66	67	0	10.0	-0.402	-0.260	KNOWN	137.6		127.6
29	65	66	63	71	15.0	-0.480	-0.309	KNOWN	138.6		123.6
30	76	31	82	0	10.0	-0.959	-0.619	KNOWN	139.9		129.9
31	25	82	27	0	10.0	-0.712	-0.459	KNOWN	143.4		133.4
32	26	29	27	0	10.0	-2.058	-1.328	KNOWN	145.5		135.5
33	64	63	62	0	20.0	-1.996	-1.288	KNOWN	139.0		119.0
34	62	60	61	0	20.0	-1.253	-0.809	KNOWN	139.4		119.4
35	71	60	59	0	10.0	-1.253	-0.809	KNOWN	138.8		128.8
36	59	58	57	0	10.0	-1.253	-0.809	KNOWN	139.3		129.3
37	61	58	56	0	15.0	-1.810	-1.168	KNOWN	139.9		124.9
38	56	55	53	0	15.0	-1.253	-0.809	KNOWN	140.6		125.6
39	57	55	54	0	15.0	-1.253	-0.809	KNOWN	140.6		125.6
40	52	53	51	0	20.0	-2.166	-1.397	KNOWN	141.1		121.1
41	45	51	50	0	35.0	-1.253	-0.809	KNOWN	144.4		109.4
42	49	54	50	0	15.0	-1.253	-0.809	KNOWN	142.6		127.6
43	77	67	68	0	10.0	-0.402	-0.260	KNOWN	136.9		126.9
44	41	69	0	0	15.0	-2.321	-1.497	KNOWN	136.2		121.2
45	41	40	39	0	15.0	-0.712	-0.459	KNOWN	136.2		121.2
46	33	32	40	38	20.0	-0.774	-0.499	KNOWN	136.2		116.2
47	39	72	37	0	60.0	-0.820	-0.529	KNOWN	134.9		74.9
48	72	35	0	0	25.0	-1.547	-0.998	KNOWN	133.5		108.5
49	46	48	44	0	20.0	-4.595	-2.965	KNOWN	145.4		125.4
50	36	79	0	0	70.0	-1.238	-0.799	KNOWN	135.1		65.1
51	38	37	36	0	60.0	0.000	0.000	KNOWN	135.2		75.2
52	70	0	0	0	10.0	-1.238	-0.799	KNOWN	132.6		122.6
53	22	0	0	0	20.0	-2.615	-1.687	KNOWN	126.4		106.4
54	34	35	79	0	20.0	-0.836	-0.539	KNOWN	135.2		115.2
55	68	69	70	0	10.0	-0.557	-0.359	KNOWN	136.5		126.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	24.013	15.492
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	0.955	0.616
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	16.019	10.335
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	19.749	12.741
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	5.806	3.746
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	17.205	11.100
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.196	0.126
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	21.361	13.782
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	1.315	0.848
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	10.870	7.013
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	23.127	14.921
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.389	0.251
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.319	5.367
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	20.414	13.170
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.320	0.207
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	16.626	10.727
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.615	1.042
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.614	0.396
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.375	0.242
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	16.576	10.694
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	14.500	9.355
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	28.493	18.383
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	5.716	3.688
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.259	0.812
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	5.041	3.252
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	11.034	7.119
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	15.196	9.804
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	8.460	5.458
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	19.110	12.329
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.033	0.667
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	14.222	9.176
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.414	0.912
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	6.512	4.202
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.116	0.075
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	3.871	2.498
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.544	0.996
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	2.615	1.687
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.049	3.257
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	10.845	6.997
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.191	1.414
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	1.462	0.943
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	1.756	1.134
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.181	0.762
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.500	0.323
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	5.424	3.499
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	5.227	3.372
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.280	2.116
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.231	0.149
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	3.786	2.443
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.052	1.324
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.832	0.536
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.800	0.516
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	5.603	3.615
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	4.368	2.818
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	5.194	3.351
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.389	0.251
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.466	0.946
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.293	1.480
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	1.739	1.122
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.763	0.492
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	3.796	2.449
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.864	0.557
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.874	0.564
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.253	0.808
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	6.480	4.181
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.231	0.149
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	7.965	5.138
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.278	1.470
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	15.381	9.923
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.493	1.609
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	4.728	3.050
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.651	0.420
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	2.972	1.918
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.889	0.574
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.845	0.545
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.838	1.186
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.068	0.689
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.042	0.673
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.480	0.309
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.795	0.513
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.443	0.285
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.238	0.799

TABLE - SLS20

20:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	22.172	14.304		154.0	KNOWN	139.0
2	81	6	7	0	20.0	33.296	21.482	KNOWN	153.1		133.1
3	81	8	0	0	20.0	6.498	4.192	KNOWN	153.1		133.1
4	9	0	0	0	20.0	16.463	10.621	KNOWN	152.5		132.5
5	8	9	80	10	40.0	-1.393	-0.898	KNOWN	152.2		112.2
6	2	6	1	3	10.0	-6.870	-4.432	KNOWN	151.9		141.9
7	1	0	0	0	45.0	1.331	0.858	KNOWN	168.5		123.5
8	3	16	47	0	10.0	-2.476	-1.597	KNOWN	150.2		140.2
9	16	5	15	46	10.0	-2.599	-1.677	KNOWN	150.3		140.3
10	4	5	14	0	10.0	-1.300	-0.838	KNOWN	151.1		141.1
11	15	14	13	28	10.0	-2.785	-1.797	KNOWN	149.7		139.7
12	7	80	13	11	20.0	-2.630	-1.697	KNOWN	152.2		132.2
13	11	12	17	0	20.0	-2.460	-1.587	KNOWN	151.6		131.6
14	10	12	18	0	35.0	-1.099	-0.709	KNOWN	151.7		116.7
15	18	19	73	0	35.0	-1.934	-1.248	KNOWN	145.6		110.6
16	28	17	75	26	15.0	-1.810	-1.168	KNOWN	149.8		134.8
17	19	75	74	0	15.0	-1.269	-0.819	KNOWN	148.6		133.6
18	47	45	49	48	20.0	-2.290	-1.477	KNOWN	149.4		129.4
19	74	20	24	25	15.0	-0.619	-0.399	KNOWN	147.7		132.7
20	73	20	21	0	30.0	-2.460	-1.587	KNOWN	144.3		114.3
21	21	23	22	0	40.0	-2.630	-1.697	KNOWN	139.2		99.2
22	30	29	44	0	10.0	-3.435	-2.216	KNOWN	149.5		139.5
23	24	23	33	34	10.0	-1.640	-1.058	KNOWN	141.3		131.3
24	43	65	64	52	15.0	-0.480	-0.309	KNOWN	144.0		129.0
25	30	43	76	0	10.0	-0.557	-0.359	KNOWN	145.7		135.7
26	42	31	32	0	15.0	-1.423	-0.918	KNOWN	142.3		127.3
27	42	78	77	0	10.0	-0.248	-0.160	KNOWN	142.2		132.2
28	78	66	67	0	10.0	-0.387	-0.250	KNOWN	142.3		132.3
29	65	66	63	71	15.0	-0.464	-0.299	KNOWN	143.2		128.2
30	76	31	82	0	10.0	-0.913	-0.589	KNOWN	144.4		134.4
31	25	82	27	0	10.0	-0.665	-0.429	KNOWN	147.7		137.7
32	26	29	27	0	10.0	-1.965	-1.268	KNOWN	149.6		139.6
33	64	63	62	0	20.0	-1.903	-1.228	KNOWN	143.6		123.6
34	62	60	61	0	20.0	-1.207	-0.779	KNOWN	144.0		124.0
35	71	60	59	0	10.0	-1.207	-0.779	KNOWN	143.4		133.4
36	59	58	57	0	10.0	-1.207	-0.779	KNOWN	143.9		133.9
37	61	58	56	0	15.0	-1.733	-1.118	KNOWN	144.5		129.5
38	56	55	53	0	15.0	-1.207	-0.779	KNOWN	145.1		130.1
39	57	55	54	0	15.0	-1.207	-0.779	KNOWN	145.1		130.1
40	52	53	51	0	20.0	-2.089	-1.348	KNOWN	145.5		125.5
41	45	51	50	0	35.0	-1.207	-0.779	KNOWN	148.6		113.6
42	49	54	50	0	15.0	-1.207	-0.779	KNOWN	146.9		131.9
43	77	67	68	0	10.0	-0.387	-0.250	KNOWN	141.8		131.8
44	41	69	0	0	15.0	-2.213	-1.427	KNOWN	141.1		126.1
45	41	40	39	0	15.0	-0.681	-0.439	KNOWN	141.1		126.1
46	33	32	40	38	20.0	-0.743	-0.479	KNOWN	141.1		121.1
47	39	72	37	0	60.0	-0.774	-0.499	KNOWN	140.0		80.0
48	72	35	0	0	25.0	-1.470	-0.948	KNOWN	138.7		113.7
49	46	48	44	0	20.0	-4.394	-2.835	KNOWN	149.5		129.5
50	36	79	0	0	70.0	-1.176	-0.759	KNOWN	140.1		70.1
51	38	37	36	0	60.0	0.000	0.000	KNOWN	140.2		80.2
52	70	0	0	0	10.0	-1.176	-0.759	KNOWN	137.8		127.8
53	22	0	0	0	20.0	-2.460	-1.587	KNOWN	132.4		112.4
54	34	35	79	0	20.0	-0.789	-0.509	KNOWN	140.2		120.2
55	68	69	70	0	10.0	-0.526	-0.339	KNOWN	141.3		131.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	22.163	14.299
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	0.978	0.631
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	15.472	9.982
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	18.802	12.130
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	5.520	3.562
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	16.463	10.621
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.197	0.127
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	20.394	13.157
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	1.331	0.858
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	10.181	6.568
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	21.924	14.145
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.334	0.215
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.039	5.186
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	19.098	12.321
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.307	0.198
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	15.858	10.231
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.526	0.985
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.586	0.378
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.366	0.236
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	15.783	10.182
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	13.823	8.918
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	27.146	17.513
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	5.472	3.530
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.211	0.781
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	4.749	3.064
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	10.521	6.788
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	14.448	9.322
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	8.041	5.188
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	18.282	11.795
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	0.989	0.638
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	13.522	8.724
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.353	0.873
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	[illegible]	3.993
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.121	0.078
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	3.643	2.350
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.448	0.934
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	2.460	1.587
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	4.808	3.102
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	10.302	6.646
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.058	1.328
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	1.432	0.924
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	1.670	1.077
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.133	0.731
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.475	0.306
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	5.162	3.331
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	4.984	3.215
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.118	2.012
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.229	0.148
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	3.601	2.323
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	1.949	1.257
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	[illegible]	0.501
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	[illegible]	0.489
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	5.288	3.411
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	4.124	2.661
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	4.922	3.175
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.355	0.229
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.396	0.900
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.182	1.408
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	1.663	1.073
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.735	0.475
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	3.605	2.326
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.826	0.533
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	[illegible]	0.540
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.197	0.772
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	6.175	3.984
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.233	0.150
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	7.615	4.913
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.170	1.400
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	14.687	9.476
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.388	1.540
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	4.496	2.900
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.581	0.375
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	2.794	1.802
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.899	0.580
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.799	0.516
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.739	1.122
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.014	0.654
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	0.988	0.638
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.456	0.294
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	[illegible]	0.484
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.425	0.274
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.176	0.759

TABLE - SLS21

21:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	21.274	13.725		155.5	KNOWN	140.5
2	81	6	7	0	20.0	32.554	21.002	KNOWN	154.7		134.7
3	81	8	0	0	20.0	6.220	4.013	KNOWN	154.7		134.7
4	9	0	0	0	20.0	15.704	10.132	KNOWN	154.1		134.1
5	8	9	80	10	40.0	-1.346	-0.868	KNOWN	153.8		113.8
6	2	6	1	3	10.0	-6.498	-4.192	KNOWN	153.6		143.6
7	1	0	0	0	45.0	1.176	0.759	KNOWN	166.8		121.8
8	3	16	47	0	10.0	-2.476	-1.597	KNOWN	152.0		142.0
9	16	5	15	46	10.0	-2.599	-1.677	KNOWN	152.1		142.1
10	4	5	14	0	10.0	-1.238	-0.799	KNOWN	152.8		142.8
11	15	14	13	28	10.0	-2.677	-1.727	KNOWN	151.6		141.6
12	7	80	13	11	20.0	-2.522	-1.627	KNOWN	153.8		133.8
13	11	12	17	0	20.0	-2.367	-1.527	KNOWN	153.3		133.3
14	10	12	18	0	35.0	-1.068	-0.689	KNOWN	153.4		118.4
15	18	19	73	0	35.0	-1.934	-1.248	KNOWN	147.7		112.7
16	28	17	75	26	15.0	-1.733	-1.118	KNOWN	151.6		136.6
17	19	75	74	0	15.0	-1.222	-0.789	KNOWN	150.5		135.5
18	47	45	49	48	20.0	-2.259	-1.457	KNOWN	151.2		131.2
19	74	20	24	25	15.0	-0.588	-0.379	KNOWN	149.6		134.6
20	73	20	21	0	30.0	-2.367	-1.527	KNOWN	146.5		116.5
21	21	23	22	0	40.0	-2.476	-1.597	KNOWN	142.0		102.0
22	30	29	44	0	10.0	-3.311	-2.136	KNOWN	151.3		141.3
23	24	23	33	34	10.0	-1.547	-0.998	KNOWN	143.8		133.8
24	43	65	64	52	15.0	-0.464	-0.299	KNOWN	146.2		131.2
25	30	43	76	0	10.0	-0.542	-0.349	KNOWN	147.8		137.8
26	42	31	32	0	15.0	-1.346	-0.868	KNOWN	144.7		129.7
27	42	78	77	0	10.0	-0.232	-0.150	KNOWN	144.6		134.6
28	78	66	67	0	10.0	-0.356	-0.230	KNOWN	144.7		134.7
29	65	66	63	71	15.0	-0.449	-0.289	KNOWN	145.5		130.5
30	76	31	82	0	10.0	-0.882	-0.569	KNOWN	146.7		136.7
31	25	82	27	0	10.0	-0.650	-0.419	KNOWN	149.7		139.7
32	26	29	27	0	10.0	-1.888	-1.218	KNOWN	151.4		141.4
33	64	63	62	0	20.0	-1.872	-1.208	KNOWN	145.8		125.8
34	62	60	61	0	20.0	-1.176	-0.759	KNOWN	146.2		126.2
35	71	60	59	0	10.0	-1.176	-0.759	KNOWN	145.6		135.6
36	59	58	57	0	10.0	-1.176	-0.759	KNOWN	146.1		136.1
37	61	58	56	0	15.0	-1.702	-1.098	KNOWN	146.6		131.6
38	56	55	53	0	15.0	-1.176	-0.759	KNOWN	147.2		132.2
39	57	55	54	0	15.0	-1.176	-0.759	KNOWN	147.2		132.2
40	52	53	51	0	20.0	-2.042	-1.318	KNOWN	147.6		127.6
41	45	51	50	0	35.0	-1.176	-0.759	KNOWN	150.5		115.5
42	49	54	50	0	15.0	-1.176	-0.759	KNOWN	148.9		133.9
43	77	67	68	0	10.0	-0.356	-0.230	KNOWN	144.2		134.2
44	41	69	0	0	15.0	-2.089	-1.348	KNOWN	143.6		128.6
45	41	40	39	0	15.0	-0.634	-0.409	KNOWN	143.6		128.6
46	33	32	40	38	20.0	-0.696	-0.449	KNOWN	143.6		123.6
47	39	72	37	0	60.0	-0.743	-0.479	KNOWN	142.6		82.6
48	72	35	0	0	25.0	-1.393	-0.898	KNOWN	141.4		116.4
49	46	48	44	0	20.0	-4.332	-2.795	KNOWN	151.3		131.3
50	36	79	0	0	70.0	-1.114	-0.719	KNOWN	142.7		72.7
51	38	37	36	0	60.0	0.000	0.000	KNOWN	142.8		82.8
52	70	0	0	0	10.0	-1.114	-0.719	KNOWN	140.7		130.7
53	22	0	0	0	20.0	-2.321	-1.497	KNOWN	135.9		115.9
54	34	35	79	0	20.0	-0.758	-0.489	KNOWN	142.8		122.8
55	68	69	70	0	10.0	-0.495	-0.319	KNOWN	143.8		133.8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	21.233	13.699
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	0.826	0.533
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	15.113	9.750
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	18.267	11.785
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	5.394	3.480
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	15.704	10.132
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.145	0.094
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	19.607	12.650
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	1.176	0.759
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	9.866	6.365
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	21.199	13.677
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.331	0.214
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	7.722	4.982
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	18.493	11.931
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.293	0.189
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	15.270	9.852
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.468	0.947
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.566	0.365
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.350	0.226
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	15.324	9.886
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	13.270	8.561
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	26.227	16.920
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	5.269	3.400
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.167	0.753
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	4.502	2.905
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	10.070	6.497
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	14.073	9.080
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	7.681	4.955
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	17.630	11.374
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	0.955	0.616
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	13.123	8.466
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.299	0.838
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	5.894	3.802
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.100	0.064
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	3.434	2.215
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.362	0.879
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	2.321	1.497
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	4.605	2.971
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	10.100	6.516
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.185	1.410
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	1.391	0.897
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	1.593	1.028
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.098	0.708
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.450	0.290
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	4.938	3.185
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	4.754	3.067
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	2.965	1.913
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.233	0.150
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	3.419	2.206
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	1.840	1.187
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.712	0.459
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.713	0.460
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	4.923	3.176
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	3.855	2.487
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	4.615	2.978
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.307	0.198
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.336	0.862
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.085	1.345
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	1.550	1.000
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.703	0.453
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	3.428	2.212
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.780	0.503
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.805	0.519
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.151	0.742
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	5.935	3.829
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.241	0.155
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	7.352	4.743
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.086	1.346
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	14.148	9.128
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.307	1.488
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	4.212	2.717
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.514	0.332
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	2.603	1.679
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.880	0.568
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.760	0.490
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.654	1.067
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	0.960	0.620
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	0.943	0.608
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.432	0.279
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.711	0.459
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.403	0.260
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.114	0.719

TABLE - SLS22

22:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	21.197	13.676		155.5	KNOWN	140.5
2	81	6	7	0	20.0	31.796	20.513	KNOWN	154.7		134.7
3	81	8	0	0	20.0	6.081	3.923	KNOWN	154.7		134.7
4	9	0	0	0	20.0	14.946	9.643	KNOWN	154.1		134.1
5	8	9	80	10	40.0	-1.315	-0.848	KNOWN	153.8		113.8
6	2	6	1	3	10.0	-7.272	-4.692	KNOWN	153.6		143.6
7	1	0	0	0	45.0	1.052	0.679	KNOWN	164.3		119.3
8	3	16	47	0	10.0	-2.816	-1.817	KNOWN	152.1		142.1
9	16	5	15	46	10.0	-2.955	-1.907	KNOWN	152.2		142.2
10	4	5	14	0	10.0	-0.944	-0.609	KNOWN	152.9		142.9
11	15	14	13	28	10.0	-2.630	-1.697	KNOWN	151.7		141.7
12	7	80	13	11	20.0	-2.476	-1.597	KNOWN	153.8		133.8
13	11	12	17	0	20.0	-2.321	-1.497	KNOWN	153.4		133.4
14	10	12	18	0	35.0	-0.944	-0.609	KNOWN	153.4		118.4
15	18	19	73	0	35.0	-1.810	-1.168	KNOWN	147.8		112.8
16	28	17	75	26	15.0	-1.702	-1.098	KNOWN	151.8		136.8
17	19	75	74	0	15.0	-1.191	-0.769	KNOWN	150.7		135.7
18	47	45	49	48	20.0	-1.996	-1.288	KNOWN	151.4		131.4
19	74	20	24	25	15.0	-0.557	-0.359	KNOWN	149.9		134.9
20	73	20	21	0	30.0	-2.321	-1.497	KNOWN	146.6		116.6
21	21	23	22	0	40.0	-2.770	-1.787	KNOWN	141.4		101.4
22	30	29	44	0	10.0	-3.249	-2.096	KNOWN	151.5		141.5
23	24	23	33	34	10.0	-1.733	-1.118	KNOWN	144.3		134.3
24	43	65	64	52	15.0	-0.418	-0.270	KNOWN	146.9		131.9
25	30	43	76	0	10.0	-0.526	-0.339	KNOWN	148.2		138.2
26	42	31	32	0	15.0	-1.269	-0.819	KNOWN	145.4		130.4
27	42	78	77	0	10.0	-0.217	-0.140	KNOWN	145.3		135.3
28	78	66	67	0	10.0	-0.340	-0.220	KNOWN	145.4		135.4
29	65	66	63	71	15.0	-0.402	-0.260	KNOWN	146.3		131.3
30	76	31	82	0	10.0	-0.866	-0.559	KNOWN	147.2		137.2
31	25	82	27	0	10.0	-0.634	-0.409	KNOWN	149.9		139.9
32	26	29	27	0	10.0	-1.857	-1.198	KNOWN	151.6		141.6
33	64	63	62	0	20.0	-1.656	-1.068	KNOWN	146.6		126.6
34	62	60	61	0	20.0	-1.037	-0.669	KNOWN	147.0		127.0
35	71	60	59	0	10.0	-1.037	-0.669	KNOWN	146.5		136.5
36	59	58	57	0	10.0	-1.037	-0.669	KNOWN	147.0		137.0
37	61	58	56	0	15.0	-1.501	-0.968	KNOWN	147.4		132.4
38	56	55	53	0	15.0	-1.037	-0.669	KNOWN	147.9		132.9
39	57	55	54	0	15.0	-1.037	-0.669	KNOWN	147.9		132.9
40	52	53	51	0	20.0	-1.810	-1.168	KNOWN	148.3		128.3
41	45	51	50	0	35.0	-1.037	-0.669	KNOWN	150.8		115.8
42	49	54	50	0	15.0	-1.037	-0.669	KNOWN	149.4		134.4
43	77	67	68	0	10.0	-0.340	-0.220	KNOWN	144.9		134.9
44	41	69	0	0	15.0	-1.980	-1.278	KNOWN	144.3		129.3
45	41	40	39	0	15.0	-0.605	-0.389	KNOWN	144.2		129.2
46	33	32	40	38	20.0	-0.665	-0.429	KNOWN	144.2		124.2
47	39	72	37	0	60.0	-0.696	-0.449	KNOWN	143.3		83.3
48	72	35	0	0	25.0	-1.315	-0.848	KNOWN	142.2		117.2
49	46	48	44	0	20.0	-3.822	-2.466	KNOWN	151.5		131.5
50	36	79	0	0	70.0	-1.052	-0.679	KNOWN	143.4		73.4
51	38	37	36	0	60.0	0.000	0.000	KNOWN	143.4		83.4
52	70	0	0	0	10.0	-1.052	-0.679	KNOWN	141.6		131.6
53	22	0	0	0	20.0	-2.599	-1.677	KNOWN	133.9		113.9
54	34	35	79	0	20.0	-0.712	-0.459	KNOWN	143.4		123.4
55	68	69	70	0	10.0	-0.480	-0.309	KNOWN	144.5		134.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	21.197	13.676
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	0.799	0.516
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	14.809	9.554
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	17.786	11.475
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	5.281	3.407
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	14.946	9.643
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.081	0.052
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	18.831	12.149
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	1.052	0.679
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	9.543	6.157
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	20.244	13.060
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.353	0.228
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	7.080	4.568
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	17.882	11.537
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.282	0.182
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	14.291	9.220
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.418	0.915
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.547	0.353
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.383	0.247
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	14.844	9.577
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	12.647	8.160
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	25.171	16.239
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	5.240	3.380
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.192	0.769
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	4.621	2.981
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	9.893	6.383
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	13.193	8.512
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	7.510	4.845
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	16.308	10.521
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	0.879	0.567
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	12.102	7.808
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.344	0.867
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	5.749	3.709
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.141	0.091
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	3.644	2.351
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.724	1.112
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	2.599	1.677
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	4.410	2.845
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	9.292	5.995
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	1.632	1.053
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	0.814	0.525
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	1.462	0.943
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	0.983	0.634
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.443	0.286
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	4.708	3.038
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	4.586	2.959
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	2.901	1.872
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.153	0.099
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	3.304	2.132
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	1.882	1.214
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.788	0.508
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.725	0.467
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	5.126	3.307
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	3.998	2.579
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	4.679	3.019
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.407	0.262
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.270	0.819
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.045	1.319
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	1.626	1.049
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.665	0.429
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	3.328	2.147
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.778	0.502
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.743	0.479
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.072	0.691
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	5.572	3.595
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.149	0.096
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	6.759	4.360
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	1.958	1.263
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	13.155	8.487
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.116	1.365
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	4.382	2.827
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.868	0.560
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	2.850	1.839
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.418	0.270
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.729	0.470
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.584	1.022
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	0.909	0.586
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	0.876	0.565
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.406	0.262
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.708	0.457
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.344	0.222
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.052	0.679

TABLE - SLS23

23:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	22.033	14.215		159.3	KNOWN	144.3
2	81	6	7	0	20.0	27.200	17.549	KNOWN	157.9		137.9
3	81	8	0	0	20.0	5.802	3.743	KNOWN	158.0		138.0
4	9	0	0	0	20.0	13.430	8.664	KNOWN	157.4		137.4
5	8	9	80	10	40.0	-1.253	-0.809	KNOWN	157.2		117.2
6	2	6	1	3	10.0	-6.901	-4.452	KNOWN	157.3		147.3
7	1	0	0	0	45.0	1.191	0.769	KNOWN	170.8		125.8
8	3	16	47	0	10.0	-2.383	-1.537	KNOWN	155.9		145.9
9	16	5	15	46	10.0	-2.507	-1.617	KNOWN	156.0		146.0
10	4	5	14	0	10.0	-0.866	-0.559	KNOWN	156.6		146.6
11	15	14	13	28	10.0	-2.507	-1.617	KNOWN	155.5		145.5
12	7	80	13	11	20.0	-2.352	-1.517	KNOWN	157.2		137.2
13	11	12	17	0	20.0	-2.213	-1.427	KNOWN	156.8		136.8
14	10	12	18	0	35.0	-0.836	-0.539	KNOWN	156.9		121.9
15	18	19	73	0	35.0	-1.594	-1.028	KNOWN	151.9		116.9
16	28	17	75	26	15.0	-1.609	-1.038	KNOWN	155.5		140.5
17	19	75	74	0	15.0	-1.129	-0.729	KNOWN	154.6		139.6
18	47	45	49	48	20.0	-1.748	-1.128	KNOWN	155.3		135.3
19	74	20	24	25	15.0	-0.542	-0.349	KNOWN	153.8		138.8
20	73	20	21	0	30.0	-2.213	-1.427	KNOWN	150.8		120.8
21	21	23	22	0	40.0	-2.630	-1.697	KNOWN	146.1		106.1
22	30	29	44	0	10.0	-3.079	-1.986	KNOWN	155.3		145.3
23	24	23	33	34	10.0	-1.640	-1.058	KNOWN	148.6		138.6
24	43	65	64	52	15.0	-0.356	-0.230	KNOWN	151.3		136.3
25	30	43	76	0	10.0	-0.495	-0.319	KNOWN	152.4		142.4
26	42	31	32	0	15.0	-1.269	-0.819	KNOWN	149.7		134.7
27	42	78	77	0	10.0	-0.217	-0.140	KNOWN	149.7		139.7
28	78	66	67	0	10.0	-0.340	-0.220	KNOWN	149.8		139.8
29	65	66	63	71	15.0	-0.340	-0.220	KNOWN	150.7		135.7
30	76	31	82	0	10.0	-0.836	-0.539	KNOWN	151.4		141.4
31	25	82	27	0	10.0	-0.603	-0.389	KNOWN	153.8		143.8
32	26	29	27	0	10.0	-1.764	-1.138	KNOWN	155.4		145.4
33	64	63	62	0	20.0	-1.454	-0.938	KNOWN	151.1		131.1
34	62	60	61	0	20.0	-0.913	-0.589	KNOWN	151.4		131.4
35	71	60	59	0	10.0	-0.913	-0.589	KNOWN	151.0		141.0
36	59	58	57	0	10.0	-0.913	-0.589	KNOWN	151.4		141.4
37	61	58	56	0	15.0	-1.315	-0.848	KNOWN	151.8		136.8
38	56	55	53	0	15.0	-0.913	-0.589	KNOWN	152.3		137.3
39	57	55	54	0	15.0	-0.913	-0.589	KNOWN	152.3		137.3
40	52	53	51	0	20.0	-1.578	-1.018	KNOWN	152.6		132.6
41	45	51	50	0	35.0	-0.913	-0.589	KNOWN	154.7		119.7
42	49	54	50	0	15.0	-0.913	-0.589	KNOWN	153.6		138.6
43	77	67	68	0	10.0	-0.340	-0.220	KNOWN	149.3		139.3
44	41	69	0	0	15.0	-1.965	-1.268	KNOWN	148.6		133.6
45	41	40	39	0	15.0	-0.603	-0.389	KNOWN	148.6		133.6
46	33	32	40	38	20.0	-0.650	-0.419	KNOWN	148.6		128.6
47	39	72	37	0	60.0	-0.712	-0.459	KNOWN	147.6		87.6
48	72	35	0	0	25.0	-1.315	-0.848	KNOWN	146.6		121.6
49	46	48	44	0	20.0	-3.373	-2.176	KNOWN	155.3		135.3
50	36	79	0	0	70.0	-1.052	-0.679	KNOWN	147.7		77.7
51	38	37	36	0	60.0	0.000	0.000	KNOWN	147.8		87.8
52	70	0	0	0	10.0	-1.052	-0.679	KNOWN	146.0		136.0
53	22	0	0	0	20.0	-2.460	-1.587	KNOWN	139.3		119.3
54	34	35	79	0	20.0	-0.712	-0.459	KNOWN	147.8		127.8
55	68	69	70	0	10.0	-0.464	-0.299	KNOWN	148.9		138.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	22.033	14.215
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	0.924	0.596
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	11.755	7.584
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	16.370	10.561
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	4.878	3.147
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	13.430	8.664
80	12	5	16.0	1280.0	75.0	0.5056	KNOWN	0.013	0.008
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	17.069	11.012
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	1.191	0.769
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	8.951	5.775
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	19.127	12.340
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.301	0.194
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	6.869	4.431
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	16.875	10.887
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.289	0.186
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	13.778	8.889
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.386	0.894
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.493	0.318
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.338	0.218
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	13.511	8.717
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	11.346	7.320
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	22.645	14.609
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	4.887	3.153
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.125	0.726
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	4.418	2.850
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	9.421	6.078
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	11.276	7.275
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	7.167	4.624
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	15.006	9.681
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	0.804	0.519
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	10.690	6.897
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.271	0.820
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	5.511	3.555
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.157	0.101
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	3.477	2.243
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.613	1.041
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	2.460	1.587
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	4.186	2.701
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	7.550	4.871
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	0.343	0.221
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	0.792	0.511
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	1.465	0.945
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	0.873	0.563
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.433	0.279
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	4.474	2.887
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	4.390	2.833
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	2.818	1.818
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.067	0.043
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	3.185	2.055
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	1.849	1.193
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.862	0.556
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.713	0.460
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	5.249	3.386
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	4.046	2.610
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	4.684	3.022
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.472	0.305
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.202	0.776
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.963	1.266
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	1.664	1.074
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.624	0.402
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	3.201	2.065
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.762	0.491
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.682	0.440
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	0.992	0.640
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	5.198	3.353
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.080	0.052
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	6.191	3.994
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	1.825	1.177
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	12.160	7.845
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	1.933	1.247
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	4.419	2.851
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.937	0.605
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	2.902	1.872
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.400	0.258
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.734	0.473
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.592	1.027
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	0.908	0.586
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	0.887	0.572
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.407	0.262
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.705	0.455
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.347	0.224
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.052	0.679

TABLE - SLS24

24:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	13.414	8.654		163.5	KNOWN	148.5
2	81	6	7	0	20.0	30.341	19.575	KNOWN	163.8		143.8
3	81	8	0	0	20.0	5.276	3.404	KNOWN	163.8		143.8
4	9	0	0	0	20.0	12.703	8.195	KNOWN	163.3		143.3
5	8	9	80	10	40.0	-1.129	-0.729	KNOWN	163.1		123.1
6	2	6	1	3	10.0	-6.127	-3.953	KNOWN	162.7		152.7
7	1	0	0	0	45.0	1.269	0.819	KNOWN	177.9		132.9
8	3	16	47	0	10.0	-2.166	-1.397	KNOWN	161.7		151.7
9	16	5	15	46	10.0	-2.274	-1.467	KNOWN	161.8		151.8
10	4	5	14	0	10.0	-0.758	-0.489	KNOWN	162.2		152.2
11	15	14	13	28	10.0	-2.259	-1.457	KNOWN	161.4		151.4
12	7	80	13	11	20.0	-2.135	-1.378	KNOWN	163.1		143.1
13	11	12	17	0	20.0	-1.996	-1.288	KNOWN	162.8		142.8
14	10	12	18	0	35.0	-0.758	-0.489	KNOWN	162.8		127.8
15	18	19	73	0	35.0	-1.501	-0.968	KNOWN	158.6		123.6
16	28	17	75	26	15.0	-1.470	-0.948	KNOWN	161.5		146.5
17	19	75	74	0	15.0	-1.021	-0.659	KNOWN	160.7		145.7
18	47	45	49	48	20.0	-1.594	-1.028	KNOWN	161.2		141.2
19	74	20	24	25	15.0	-0.495	-0.319	KNOWN	160.1		145.1
20	73	20	21	0	30.0	-1.996	-1.288	KNOWN	157.7		127.7
21	21	23	22	0	40.0	-2.321	-1.497	KNOWN	153.9		113.9
22	30	29	44	0	10.0	-2.800	-1.807	KNOWN	161.3		151.3
23	24	23	33	34	10.0	-1.454	-0.938	KNOWN	155.8		145.8
24	43	65	64	52	15.0	-0.325	-0.210	KNOWN	157.9		142.9
25	30	43	76	0	10.0	-0.449	-0.289	KNOWN	158.8		148.8
26	42	31	32	0	15.0	-1.160	-0.749	KNOWN	156.6		141.6
27	42	78	77	0	10.0	-0.201	-0.130	KNOWN	156.6		146.6
28	78	66	67	0	10.0	-0.309	-0.200	KNOWN	156.7		146.7
29	65	66	63	71	15.0	-0.325	-0.210	KNOWN	157.5		142.5
30	76	31	82	0	10.0	-0.743	-0.479	KNOWN	158.0		148.0
31	25	82	27	0	10.0	-0.542	-0.349	KNOWN	160.1		150.1
32	26	29	27	0	10.0	-1.594	-1.028	KNOWN	161.4		151.4
33	64	63	62	0	20.0	-1.315	-0.848	KNOWN	157.7		137.7
34	62	60	61	0	20.0	-0.836	-0.539	KNOWN	158.0		138.0
35	71	60	59	0	10.0	-0.836	-0.539	KNOWN	157.7		147.7
36	59	58	57	0	10.0	-0.836	-0.539	KNOWN	158.0		148.0
37	61	58	56	0	15.0	-1.191	-0.769	KNOWN	158.4		143.4
38	56	55	53	0	15.0	-0.836	-0.539	KNOWN	158.7		143.7
39	57	55	54	0	15.0	-0.836	-0.539	KNOWN	158.7		143.7
40	52	53	51	0	20.0	-1.439	-0.928	KNOWN	159.0		139.0
41	45	51	50	0	35.0	-0.836	-0.539	KNOWN	160.8		125.8
42	49	54	50	0	15.0	-0.836	-0.539	KNOWN	159.8		144.8
43	77	67	68	0	10.0	-0.309	-0.200	KNOWN	156.3		146.3
44	41	69	0	0	15.0	-1.779	-1.148	KNOWN	155.7		140.7
45	41	40	39	0	15.0	-0.542	-0.349	KNOWN	155.7		140.7
46	33	32	40	38	20.0	-0.603	-0.389	KNOWN	155.7		135.7
47	39	72	37	0	60.0	-0.634	-0.409	KNOWN	154.9		94.9
48	72	35	0	0	25.0	-1.191	-0.769	KNOWN	154.1		129.1
49	46	48	44	0	20.0	-3.064	-1.976	KNOWN	161.3		141.3
50	36	79	0	0	70.0	-0.959	-0.619	KNOWN	155.0		85.0
51	38	37	36	0	60.0	0.000	0.000	KNOWN	155.1		95.1
52	70	0	0	0	10.0	-0.959	-0.619	KNOWN	153.5		143.5
53	22	0	0	0	20.0	-2.182	-1.407	KNOWN	148.4		128.4
54	34	35	79	0	20.0	-0.650	-0.419	KNOWN	155.1		135.1
55	68	69	70	0	10.0	-0.433	-0.279	KNOWN	155.9		145.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	13.410	8.652
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	0.585	0.378
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	15.214	9.815
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	15.713	10.137
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	4.691	3.026
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	12.703	8.195
80	12	5	16.0	1280.0	75.0	0.5056	KNOWN	0.062	0.040
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	16.326	10.533
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	1.269	0.819
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	7.615	4.913
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	16.155	10.422
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.283	0.182
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	5.732	3.698
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	14.264	9.202
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.226	0.146
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	11.481	7.407
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.133	0.731
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.486	0.313
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.415	0.268
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	13.030	8.406
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	11.089	7.154
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	22.123	14.273
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	4.479	2.890
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.999	0.645
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	3.977	2.566
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	8.517	5.495
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	11.721	7.562
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	6.497	4.192
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	13.611	8.781
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	0.730	0.471
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	10.203	6.583
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.129	0.729
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	4.993	3.221
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.120	0.078
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	3.111	2.007
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.392	0.898
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	2.182	1.407
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	3.782	2.440
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	8.369	5.399
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	1.786	1.152
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	0.812	0.524
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	1.335	0.861
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	0.800	0.516
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.390	0.252
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	4.044	2.609
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	3.959	2.554
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	2.533	1.634
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.075	0.049
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	2.887	1.863
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	1.651	1.065
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.766	0.494
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.640	0.413
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	4.698	3.031
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	3.623	2.337
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	4.216	2.720
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.416	0.268
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.097	0.707
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.759	1.135
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	1.487	0.960
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.566	0.365
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	2.889	1.864
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.686	0.442
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.621	0.401
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	0.900	0.581
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	4.701	3.033
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.085	0.055
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	5.621	3.627
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	1.651	1.065
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	11.019	7.109
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	1.756	1.133
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	3.953	2.551
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.782	0.504
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	2.561	1.652
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.422	0.272
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	0.662	0.427
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.438	0.928
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	0.823	0.531
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	0.796	0.513
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.368	0.238
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.642	0.414
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.317	0.205
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	0.959	0.619

Boston Water

APPENDIX SLS2

ANALYSIS: YEAR 2020

Charles A. Maguire & Associates

Boston Hartford Providence

TABLE SLS-25
STUDY DAY: YEAR 2020
UNIMPROVED NETWORK

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION CFS	MGD	- STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	58.727	37.889		153.0	KNOWN	138.0
2	81	6	7	0	20.0	75.984	49.022		146.0	KNOWN	126.0
3	81	8	0	0	20.0	9.226	5.952		146.0	KNOWN	126.0
4	9	0	0	0	20.0	51.936	33.507		146.0	KNOWN	126.0
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	143.6		103.6
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	140.4		130.4
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	69.5		24.5
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	131.6		121.6
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	132.3		122.3
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	136.2		126.2
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	130.0		120.0
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	142.2		122.2
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	140.1		120.1
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	140.8		105.8
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	102.1		67.1
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	130.0		115.0
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	121.7		106.7
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	127.8		107.8
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	114.8		99.8
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	91.5		61.5
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	35.7		-4.3
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	128.4		118.4
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	62.6		52.6
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	96.1		81.1
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	103.6		93.6
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	76.1		61.1
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	76.2		66.2
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	78.5		68.5
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	89.8		74.8
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	94.1		84.1
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	115.8		105.8
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	128.9		118.9
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	93.7		73.7
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	98.2		78.2
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	95.0		85.0
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	99.3		89.3
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	102.0		87.0
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	105.5		90.5
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	105.5		90.5
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	107.7		87.7
41	45	51	50	0	35.0	-2.247	-1.450	KNOWN	123.8		88.8
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	115.9		100.9
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	71.9		61.9
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	63.4		48.4
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	62.3		47.3
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	62.3		42.3
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	49.2		-10.8
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	38.8		13.8
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	128.3		108.3
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	50.1		-19.9
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	50.3		-9.7
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	37.8		27.8
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	-42.7		-62.7
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	51.1		31.1
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	66.7		56.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	58.727	37.889
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	0.000	0.000
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	36.170	23.335
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	39.814	25.687
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	9.226	5.952
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	51.936	33.507
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.730	1.116
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	56.379	36.373
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	24.648	15.902
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	52.393	33.802
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.925	0.597
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	18.195	11.739
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	45.981	29.665
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.653	0.422
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	36.637	23.637
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	3.498	2.257
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.413	0.912
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.310	0.200
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	34.365	22.171
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	39.435	25.442
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	68.406	44.133
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	14.805	9.552
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	3.346	2.159
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	14.772	9.531
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	29.658	19.135
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	34.640	22.348
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	23.646	15.256
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	43.903	28.324
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	2.311	1.491
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	32.297	20.837
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	3.860	2.490
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	19.216	12.397
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.871	0.562
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	13.238	8.541
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	5.811	3.749
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.222	5.950
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	13.172	8.498
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	24.316	15.688
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	3.890	2.510
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.062	1.330
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	5.980	3.858
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	2.519	1.625
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	1.539	0.993
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	14.651	9.452
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	14.554	9.390
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	9.475	6.113
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.250	0.161
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	11.425	7.371
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	7.227	4.662
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	3.675	2.371
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	2.650	1.710
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	20.570	13.271
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	15.701	10.130
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	17.608	11.360
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	2.275	1.467
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	3.888	2.509
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	6.185	3.990
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	6.523	4.208
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.890	1.219
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	10.660	6.878
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	2.632	1.698
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.944	1.254
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.936	1.894
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	15.844	10.222
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.579	0.374
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	17.705	11.422
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	5.569	3.593
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	36.150	23.322
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	5.506	3.552
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	17.158	11.070
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	4.990	3.220
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	11.841	7.640
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.140	0.090
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	3.023	1.951
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	6.869	4.432
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	3.132	2.020
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	2.526	1.630
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	1.425	0.920
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.599	1.032
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	2.074	1.338
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.673	2.370

TABLE SLS-26
STUDY DAY: YEAR 2020
IMPROVED NETWORK

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION CFS	MGD	- STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	91.845	59.255		153.0	KNOWN	138.0
2	81	6	7	0	20.0	64.879	41.858		146.0	KNOWN	126.0
3	81	8	0	0	20.0	10.451	6.743		146.0	KNOWN	126.0
4	9	0	0	0	20.0	28.348	18.289		146.0	KNOWN	126.0
5	8	9	80	10	40.0	-3.048	-1.966	KNOWN	145.2		105.2
6	2	6	1	3	10.0	-14.915	-9.623	KNOWN	145.1		135.1
7	1	0	0	0	45.0	-2.909	-1.877	KNOWN	74.5		29.5
8	3	16	47	0	10.0	-7.365	-4.751	KNOWN	140.8		130.8
9	16	5	15	46	10.0	-7.752	-5.001	KNOWN	140.8		130.8
10	4	5	14	0	10.0	-2.909	-1.877	KNOWN	142.7		132.7
11	15	14	13	28	10.0	-5.864	-3.783	KNOWN	139.9		129.9
12	7	80	13	11	20.0	-5.756	-3.713	KNOWN	144.7		124.7
13	11	12	17	0	20.0	-5.384	-3.474	KNOWN	143.9		123.9
14	10	12	18	0	35.0	-2.135	-1.378	KNOWN	144.1		109.1
15	18	19	73	0	35.0	-3.373	-2.176	KNOWN	132.2		97.2
16	28	17	75	26	15.0	-3.791	-2.446	KNOWN	138.8		123.8
17	19	75	74	0	15.0	-2.661	-1.717	KNOWN	135.5		120.5
18	47	45	49	48	20.0	-4.270	-2.755	KNOWN	138.7		118.7
19	74	20	24	25	15.0	-1.439	-0.928	KNOWN	132.5		117.5
20	73	20	21	0	30.0	-5.384	-3.474	KNOWN	129.1		99.1
21	21	23	22	0	40.0	-9.809	-6.329	KNOWN	114.1		74.1
22	30	29	44	0	10.0	-7.241	-4.672	KNOWN	138.3		128.3
23	24	23	33	34	10.0	-5.353	-3.454	KNOWN	120.0		110.0
24	43	65	64	52	15.0	-0.882	-0.569	KNOWN	126.9		111.9
25	30	43	76	0	10.0	-1.176	-0.759	KNOWN	131.4		121.4
26	42	31	32	0	15.0	-4.441	-2.865	KNOWN	122.6		107.6
27	42	78	77	0	10.0	-0.774	-0.499	KNOWN	122.8		112.8
28	78	66	67	0	10.0	-1.191	-0.769	KNOWN	123.3		113.3
29	65	66	63	71	15.0	-0.851	-0.549	KNOWN	125.4		110.4
30	76	31	82	0	10.0	-1.934	-1.248	KNOWN	129.1		119.1
31	25	82	27	0	10.0	-1.423	-0.918	KNOWN	134.8		124.8
32	26	29	27	0	10.0	-4.131	-2.665	KNOWN	138.4		128.4
33	64	63	62	0	20.0	-3.559	-2.296	KNOWN	126.0		106.0
34	62	60	61	0	20.0	-2.243	-1.447	KNOWN	126.4		106.4
35	71	60	59	0	10.0	-2.243	-1.447	KNOWN	125.4		115.4
36	59	58	57	0	10.0	-2.243	-1.447	KNOWN	126.0		116.0
37	61	58	56	0	15.0	-3.234	-2.086	KNOWN	127.0		112.0
38	56	55	53	0	15.0	-2.243	-1.447	KNOWN	129.0		114.0
39	57	55	54	0	15.0	-2.243	-1.447	KNOWN	129.0		114.0
40	52	53	51	0	20.0	-3.884	-2.506	KNOWN	130.6		110.6
41	45	51	50	0	35.0	-2.243	-1.447	KNOWN	135.6		100.6
42	49	54	50	0	15.0	-2.243	-1.447	KNOWN	132.2		117.2
43	77	67	68	0	10.0	-1.191	-0.769	KNOWN	122.2		112.2
44	41	69	0	0	15.0	-6.839	-4.412	KNOWN	119.2		104.2
45	41	40	39	0	15.0	-2.104	-1.358	KNOWN	119.2		104.2
46	33	32	40	38	20.0	-2.274	-1.467	KNOWN	119.3		99.3
47	39	72	37	0	60.0	-2.414	-1.557	KNOWN	115.8		55.8
48	72	35	0	0	25.0	-4.549	-2.935	KNOWN	114.0		89.0
49	46	48	44	0	20.0	-8.216	-5.301	KNOWN	138.8		118.8
50	36	79	0	0	70.0	-3.667	-2.366	KNOWN	116.3		46.3
51	38	37	36	0	60.0	-2.739	-1.767	KNOWN	116.3		56.3
52	70	0	0	0	10.0	-3.667	-2.366	KNOWN	90.8		80.8
53	22	0	0	0	20.0	-9.206	-5.939	KNOWN	35.9		15.9
54	34	35	79	0	20.0	-2.476	-1.597	KNOWN	116.8		96.8
55	68	69	70	0	10.0	-1.640	-1.058	KNOWN	119.5		109.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	135.0	0.0018	KNOWN	91.845	59.255
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	0.000	0.000
6	2	6	48.0	4960.0	135.0	0.0031	KNOWN	20.744	13.383
7	2	12	48.0	1920.0	135.0	0.0012	KNOWN	44.136	28.475
8	3	5	30.0	1600.0	135.0	0.0100	KNOWN	10.451	6.743
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	28.348	18.289
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.076	0.694
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	34.675	22.371
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.909	1.877
3	6	8	40.0	4160.0	135.0	0.0064	KNOWN	33.924	21.886
4	6	10	48.0	1920.0	135.0	0.0012	KNOWN	60.841	39.252
16	8	9	16.0	592.0	135.0	0.0788	KNOWN	0.270	0.174
47	8	18	40.0	3200.0	135.0	0.0049	KNOWN	26.289	16.961
5	10	9	48.0	2240.0	135.0	0.0014	KNOWN	49.213	31.751
15	9	11	16.0	4000.0	135.0	0.5326	KNOWN	1.285	0.829
46	9	49	48.0	3350.0	135.0	0.0021	KNOWN	40.446	26.094
14	10	11	24.0	2720.0	135.0	0.0503	KNOWN	8.719	5.625
13	12	11	16.0	5120.0	135.0	0.6818	KNOWN	2.846	1.836
28	11	16	24.0	1650.0	135.0	0.0305	KNOWN	6.986	4.507
11	12	13	48.0	1440.0	135.0	0.0009	KNOWN	36.610	23.619
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	16.297	10.514
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	47.523	30.660
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	16.242	10.479
19	17	15	16.0	3840.0	135.0	0.5113	KNOWN	2.720	1.755
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	15.590	10.058
75	16	17	30.0	950.0	135.0	0.0059	KNOWN	30.641	19.768
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	20.077	12.953
74	17	19	30.0	1200.0	135.0	0.0075	KNOWN	25.260	16.297
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	38.159	24.619
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.670	1.077
48	49	18	48.0	640.0	135.0	0.0004	KNOWN	17.809	11.490
20	19	20	16.0	3200.0	135.0	0.4261	KNOWN	3.076	1.985
24	19	23	30.0	5600.0	135.0	0.0349	KNOWN	23.951	15.452
25	31	19	16.0	2000.0	135.0	0.2663	KNOWN	3.206	2.069
21	20	21	24.0	6720.0	135.0	0.1242	KNOWN	13.281	8.569
23	23	21	20.0	5120.0	135.0	0.2300	KNOWN	5.734	3.699
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.206	5.939
30	22	25	20.0	1040.0	135.0	0.0467	KNOWN	14.839	9.573
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	7.658	4.941
44	49	22	48.0	3840.0	120.0	0.0030	KNOWN	14.421	9.304
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	5.450	3.516
34	23	54	20.0	1760.0	135.0	0.0791	KNOWN	7.413	4.783
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	4.044	2.609
65	24	29	16.0	3360.0	135.0	0.4474	KNOWN	1.963	1.267
64	24	33	36.0	2400.0	135.0	0.0062	KNOWN	14.499	9.354
52	40	24	30.0	4960.0	135.0	0.0309	KNOWN	13.300	8.581
76	25	30	20.0	800.0	135.0	0.0359	KNOWN	9.619	6.206
42	27	26	16.0	3200.0	135.0	0.4261	KNOWN	0.629	0.406
31	30	26	20.0	1600.0	135.0	0.0719	KNOWN	11.342	7.318
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	7.530	4.858
78	28	27	16.0	450.0	135.0	0.0599	KNOWN	3.138	2.025
77	27	43	16.0	1600.0	135.0	0.2131	KNOWN	1.736	1.120
66	29	28	30.0	2000.0	135.0	0.0125	KNOWN	15.759	10.167
67	28	43	30.0	1920.0	135.0	0.0120	KNOWN	11.429	7.374
63	33	29	30.0	800.0	135.0	0.0050	KNOWN	14.316	9.236
71	35	29	16.0	3200.0	135.0	0.4261	KNOWN	0.331	0.214
82	31	30	16.0	3900.0	135.0	0.5193	KNOWN	3.657	2.360
27	32	31	20.0	1600.0	135.0	0.0719	KNOWN	8.287	5.347
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	3.375	2.177
60	34	35	16.0	2800.0	135.0	0.3728	KNOWN	1.677	1.082
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	7.296	4.707
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.898	0.579
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.154	0.745
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.987	1.282
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	11.682	7.537
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	1.084	0.699
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	15.215	9.816
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.944	1.899
51	41	40	30.0	1280.0	135.0	0.0080	KNOWN	32.396	20.901
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	3.518	2.270
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	11.974	7.725
41	45	44	30.0	2720.0	135.0	0.0170	KNOWN	0.172	0.111
69	55	44	30.0	1600.0	135.0	0.0100	KNOWN	6.667	4.301
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	3.733	2.408
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.457	0.940
38	46	51	20.0	1840.0	135.0	0.0826	KNOWN	6.973	4.499
72	47	48	20.0	5290.0	135.0	0.2376	KNOWN	2.994	1.932
37	51	47	20.0	800.0	135.0	0.0359	KNOWN	3.950	2.549
35	54	48	16.0	9100.0	135.0	1.2117	KNOWN	1.555	1.003
36	51	50	20.0	880.0	135.0	0.0305	KNOWN	0.285	0.184
79	54	50	20.0	1120.0	135.0	0.0503	KNOWN	3.383	2.182
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.667	2.366

Boston Water

APPENDIX SLS3

REHABILITATION SEQUENCE

Charles A. Maguire & Associates

Boston Hartford Providence

TABLE - SLS27
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 40 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,5		120,5
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,6		120,6
4	9	0	0	0	20,0	21,793	14,060	KNOWN	139,9		119,9
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,4		99,4
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,7		125,7
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,6		118,6
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,7		103,7
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	130,1		95,1
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,8		120,8
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	134,0		119,0
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,1		115,1
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	132,6		117,6
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	128,0		98,0
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	120,0		80,0
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	123,1		113,1
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	127,5		112,5
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	129,7		119,7
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	124,5		109,5
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	124,2		114,2
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	124,4		114,4
29	65	66	63	71	15,0	0,000	0,000	KNOWN	126,4		111,4
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	127,8		117,8
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	132,7		122,7
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,5		125,5
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	127,0		107,0
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	127,7		107,7
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	126,9		116,9
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	127,7		117,7
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	128,5		113,5
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	129,3		114,3
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	129,3		114,3
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	129,9		109,9
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,1		99,1
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	131,9		116,9
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	123,2		113,2
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	121,6		106,6
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	121,4		106,4
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	122,9		102,9
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	120,4		60,4
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	118,2		93,2
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,3		115,3
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	120,9		50,9
51	38	37	36	0	60,0	0,000	0,000	KNOWN	120,9		60,9
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	116,0		106,0
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	109,5		89,5
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	121,0		101,0
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	122,2		112,2

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48,0	2880,0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48,0	800,0	86,0	0,0012	KNOWN	2,714	1,751
6	2	6	48,0	4960,0	86,0	0,0072	KNOWN	19,582	12,633
7	2	12	48,0	1920,0	70,0	0,0041	KNOWN	22,286	14,378
8	3	5	30,0	1600,0	65,0	0,0386	KNOWN	6,278	4,050
9	4	5	48,0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16,0	1280,0	75,0	0,5056	KNOWN	0,485	0,313
10	5	14	48,0	2080,0	120,0	0,0016	KNOWN	25,868	16,689
1	7	6	16,0	11700,0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40,0	4160,0	67,0	0,0234	KNOWN	12,720	8,207
4	6	10	48,0	1920,0	86,0	0,0028	KNOWN	27,058	17,457
16	9	8	16,0	592,0	40,0	0,7482	KNOWN	0,496	0,320
47	8	18	40,0	3200,0	67,0	0,0180	KNOWN	8,908	5,747
5	10	9	48,0	2240,0	86,0	0,0033	KNOWN	23,554	15,196
15	9	11	16,0	4000,0	40,0	5,0552	KNOWN	0,346	0,223
46	9	49	48,0	3350,0	85,0	0,0050	KNOWN	18,171	11,723
14	10	11	24,0	2720,0	35,0	0,6109	KNOWN	1,814	1,170
13	12	11	16,0	5120,0	40,0	6,4706	KNOWN	0,728	0,470
28	16	11	24,0	1650,0	30,0	0,4929	KNOWN	0,538	0,347
11	12	13	48,0	1440,0	70,0	0,0031	KNOWN	18,817	12,140
12	14	13	48,0	960,0	120,0	0,0008	KNOWN	18,043	11,640
17	13	16	48,0	5120,0	120,0	0,0040	KNOWN	33,837	21,830
18	14	15	24,0	3680,0	65,0	0,2630	KNOWN	6,604	4,260
19	17	15	16,0	3840,0	63,0	2,0943	KNOWN	1,415	0,913
73	15	20	24,0	1040,0	66,0	0,0722	KNOWN	6,067	3,914
75	16	17	30,0	950,0	80,0	0,0156	KNOWN	12,950	8,355
26	16	32	48,0	1950,0	120,0	0,0015	KNOWN	18,087	11,669
74	17	19	30,0	1200,0	80,0	0,0197	KNOWN	9,991	6,446
45	18	41	48,0	4550,0	120,0	0,0036	KNOWN	21,485	13,862
49	18	42	16,0	5600,0	70,0	2,5133	KNOWN	1,152	0,743
48	49	18	48,0	640,0	85,0	0,0010	KNOWN	16,155	10,423
20	19	20	16,0	3200,0	60,0	1,9101	KNOWN	1,612	1,040
24	19	23	30,0	5600,0	50,0	0,2193	KNOWN	7,674	4,951
25	31	19	16,0	2000,0	60,0	1,1938	KNOWN	0,128	0,083
21	20	21	24,0	6720,0	66,0	0,4668	KNOWN	4,641	2,994
23	23	21	20,0	5120,0	60,0	1,0309	KNOWN	1,807	1,166
22	21	53	20,0	8470,0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20,0	1040,0	60,0	0,2094	KNOWN	5,929	3,825
29	32	22	48,0	1920,0	120,0	0,0015	KNOWN	12,964	8,364
44	22	49	48,0	3840,0	120,0	0,0030	KNOWN	2,798	1,805
33	23	46	30,0	4800,0	80,0	0,0788	KNOWN	1,401	0,904
34	23	54	20,0	1760,0	55,0	0,4163	KNOWN	2,382	1,537
43	25	24	16,0	2560,0	64,0	1,3561	KNOWN	1,286	0,830
65	24	29	16,0	3360,0	50,0	2,8102	KNOWN	0,618	0,399
64	24	33	36,0	2400,0	80,0	0,0162	KNOWN	6,403	4,131
52	40	24	30,0	4960,0	80,0	0,0814	KNOWN	6,246	4,030
76	25	30	20,0	800,0	63,0	0,1472	KNOWN	3,960	2,555
42	26	27	16,0	3200,0	60,0	1,9101	KNOWN	0,385	0,249
31	30	26	20,0	1600,0	78,0	0,1983	KNOWN	4,568	2,947
32	26	46	20,0	1760,0	60,0	0,3544	KNOWN	2,215	1,429
78	28	27	16,0	450,0	70,0	0,2020	KNOWN	1,109	0,715
77	27	43	16,0	1600,0	70,0	0,7181	KNOWN	1,186	0,765
66	29	28	30,0	2000,0	70,0	0,0420	KNOWN	7,948	5,128
67	28	43	30,0	1920,0	70,0	0,0403	KNOWN	6,326	4,081
63	33	29	30,0	800,0	65,0	0,0193	KNOWN	6,672	4,304
71	35	29	16,0	3200,0	80,0	1,1218	KNOWN	0,658	0,425
82	31	30	16,0	3900,0	70,0	1,7503	KNOWN	1,739	1,122
27	32	31	20,0	1600,0	50,0	0,4514	KNOWN	2,697	1,740
62	34	33	24,0	1920,0	65,0	0,1372	KNOWN	2,346	1,514
60	34	35	16,0	2800,0	80,0	0,9816	KNOWN	0,893	0,576
61	37	34	24,0	880,0	75,0	0,0483	KNOWN	4,557	2,940
59	36	35	16,0	2080,0	80,0	0,7292	KNOWN	1,083	0,699
58	37	36	16,0	2230,0	80,0	0,7818	KNOWN	0,979	0,632
57	39	36	16,0	2400,0	80,0	0,8414	KNOWN	1,421	0,917
56	38	37	30,0	1280,0	80,0	0,0210	KNOWN	7,427	4,792
55	38	39	30,0	560,0	80,0	0,0092	KNOWN	0,133	0,086
53	40	38	30,0	640,0	80,0	0,0105	KNOWN	8,877	5,727
54	42	39	16,0	960,0	70,0	0,4309	KNOWN	2,608	1,682
51	41	40	30,0	1280,0	80,0	0,0210	KNOWN	17,390	11,219
50	41	42	16,0	960,0	80,0	0,3365	KNOWN	2,769	1,787
68	43	55	30,0	1280,0	70,0	0,0269	KNOWN	7,000	4,516
41	44	45	30,0	2720,0	70,0	0,0572	KNOWN	1,682	1,085
69	55	44	30,0	1600,0	70,0	0,0336	KNOWN	4,691	3,026
40	46	45	30,0	1280,0	0,0	99,9999	KNOWN	0,001	0,001
39	45	47	16,0	2400,0	55,0	1,6828	KNOWN	0,755	0,487
38	46	51	20,0	1840,0	63,0	0,3385	KNOWN	2,610	1,684
72	47	48	20,0	5290,0	55,0	1,2512	KNOWN	1,361	0,878
37	51	47	20,0	800,0	55,0	0,1892	KNOWN	1,675	1,080
35	54	48	16,0	9100,0	55,0	6,3805	KNOWN	0,638	0,412
36	51	50	20,0	880,0	110,0	0,0577	KNOWN	0,936	0,604
79	54	50	20,0	1120,0	55,0	0,2649	KNOWN	0,660	0,426
70	55	52	16,0	3700,0	55,0	2,5943	KNOWN	1,597	1,030

TABLE - SLS28
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 33 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,6		120,6
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,6		120,6
4	9	0	0	0	20,0	21,793	14,060	KNOWN	139,9		119,9
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,4		99,4
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,7		125,7
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,6		118,6
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,7		103,7
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	130,3		95,3
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,8		120,8
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	134,1		119,1
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,1		115,1
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	132,8		117,8
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	128,3		98,3
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	120,7		80,7
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	124,3		114,3
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	127,2		112,2
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	129,4		119,4
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	123,6		108,6
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	123,6		113,6
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	123,9		113,9
29	65	66	63	71	15,0	0,000	0,000	KNOWN	126,0		111,0
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	127,3		117,3
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	132,8		122,8
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,5		125,5
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	126,7		106,7
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	127,4		107,4
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	126,6		116,6
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	127,5		117,5
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	128,3		113,3
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	129,2		114,2
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	129,2		114,2
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	129,8		109,8
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,0		99,0
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	131,8		116,8
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	122,7		112,7
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	121,2		106,2
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	121,0		106,0
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	121,0		101,0
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	119,7		59,7
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	117,6		92,6
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,3		115,3
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	120,2		50,2
51	38	37	36	0	60,0	0,000	0,000	KNOWN	120,2		60,2
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	115,6		105,6
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	110,2		90,2
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	120,7		100,7
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	121,8		111,8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48,0	2880,0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48,0	800,0	86,0	0,0012	KNOWN	2,505	1,616
6	2	6	48,0	4960,0	86,0	0,0072	KNOWN	19,651	12,678
7	2	12	48,0	1920,0	70,0	0,0041	KNOWN	22,240	14,348
8	3	5	30,0	1600,0	65,0	0,0386	KNOWN	6,253	4,034
9	4	5	48,0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16,0	1280,0	75,0	0,5056	KNOWN	0,490	0,316
10	5	14	48,0	2080,0	120,0	0,0016	KNOWN	25,835	16,668
1	7	6	16,0	11700,0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40,0	4160,0	67,0	0,0234	KNOWN	12,750	8,226
4	6	10	48,0	1920,0	86,0	0,0028	KNOWN	27,097	17,482
16	9	8	16,0	592,0	40,0	0,7482	KNOWN	0,501	0,323
47	8	18	40,0	3200,0	67,0	0,0180	KNOWN	8,942	5,769
5	10	9	48,0	2240,0	86,0	0,0033	KNOWN	23,601	15,226
15	9	11	16,0	4000,0	40,0	5,0552	KNOWN	0,341	0,220
46	9	49	48,0	3350,0	85,0	0,0050	KNOWN	18,217	11,753
14	10	11	24,0	2720,0	35,0	0,6109	KNOWN	1,807	1,166
13	12	11	16,0	5120,0	40,0	6,4706	KNOWN	0,729	0,470
28	16	11	24,0	1650,0	30,0	0,4929	KNOWN	0,549	0,354
11	12	13	48,0	1440,0	70,0	0,0031	KNOWN	18,777	12,114
12	14	13	48,0	960,0	120,0	0,0008	KNOWN	18,124	11,693
17	13	16	48,0	5120,0	120,0	0,0040	KNOWN	33,863	21,847
18	14	15	24,0	3680,0	65,0	0,2630	KNOWN	6,517	4,205
19	17	15	16,0	3840,0	63,0	2,0943	KNOWN	1,389	0,896
73	15	20	24,0	1040,0	66,0	0,0722	KNOWN	5,954	3,841
75	16	17	30,0	950,0	80,0	0,0156	KNOWN	12,637	8,153
26	16	32	48,0	1950,0	120,0	0,0015	KNOWN	18,461	11,910
74	17	19	30,0	1200,0	80,0	0,0197	KNOWN	9,698	6,257
45	18	41	48,0	4550,0	120,0	0,0036	KNOWN	21,761	14,039
49	18	42	16,0	5600,0	70,0	2,5133	KNOWN	1,166	0,752
48	49	18	48,0	640,0	85,0	0,0010	KNOWN	16,480	10,632
20	19	20	16,0	3200,0	60,0	1,9101	KNOWN	1,587	1,024
24	19	23	30,0	5600,0	50,0	0,2193	KNOWN	7,223	4,660
25	19	31	16,0	2000,0	60,0	1,1938	KNOWN	0,051	0,033
21	20	21	24,0	6720,0	66,0	0,4668	KNOWN	4,503	2,905
23	23	21	20,0	5120,0	60,0	1,0309	KNOWN	1,945	1,255
22	21	53	20,0	8470,0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20,0	1040,0	60,0	0,2094	KNOWN	6,101	3,936
29	32	22	48,0	1920,0	120,0	0,0015	KNOWN	13,416	8,656
44	22	49	48,0	3840,0	120,0	0,0030	KNOWN	3,083	1,989
33	23	46	30,0	4800,0	0,0	99,9999	KNOWN	0,001	0,001
34	23	54	20,0	1760,0	55,0	0,4163	KNOWN	3,200	2,064
43	25	24	16,0	2560,0	64,0	1,3561	KNOWN	1,271	0,820
65	24	29	16,0	3360,0	50,0	2,8102	KNOWN	0,635	0,410
64	24	33	36,0	2400,0	80,0	0,0162	KNOWN	6,525	4,210
52	40	24	30,0	4960,0	80,0	0,0814	KNOWN	6,400	4,129
76	25	30	20,0	800,0	63,0	0,1472	KNOWN	4,149	2,677
42	26	27	16,0	3200,0	60,0	1,9101	KNOWN	0,045	0,029
31	30	26	20,0	1600,0	78,0	0,1983	KNOWN	4,873	3,144
32	26	46	20,0	1760,0	60,0	0,3544	KNOWN	2,891	1,865
78	28	27	16,0	450,0	70,0	0,2020	KNOWN	1,394	0,900
77	27	43	16,0	1600,0	70,0	0,7181	KNOWN	1,099	0,709
66	29	28	30,0	2000,0	70,0	0,0420	KNOWN	8,232	5,311
67	28	43	30,0	1920,0	70,0	0,0403	KNOWN	6,326	4,081
63	33	29	30,0	800,0	65,0	0,0193	KNOWN	6,893	4,447
71	35	29	16,0	3200,0	80,0	1,1218	KNOWN	0,704	0,454
82	31	30	16,0	3900,0	70,0	1,7503	KNOWN	1,856	1,197
27	32	31	20,0	1600,0	50,0	0,4514	KNOWN	2,627	1,695
62	34	33	24,0	1920,0	65,0	0,1372	KNOWN	2,445	1,578
60	34	35	16,0	2800,0	80,0	0,9816	KNOWN	0,908	0,586
61	37	34	24,0	880,0	75,0	0,0483	KNOWN	4,671	3,013
59	36	35	16,0	2080,0	80,0	0,7292	KNOWN	1,114	0,719
58	37	36	16,0	2230,0	80,0	0,7818	KNOWN	0,990	0,639
57	39	36	16,0	2400,0	80,0	0,8414	KNOWN	1,441	0,930
56	38	37	30,0	1280,0	80,0	0,0210	KNOWN	7,552	4,872
55	38	39	30,0	560,0	80,0	0,0092	KNOWN	0,109	0,070
53	40	38	30,0	640,0	80,0	0,0105	KNOWN	8,978	5,792
54	42	39	16,0	960,0	70,0	0,4309	KNOWN	2,650	1,710
51	41	40	30,0	1280,0	80,0	0,0210	KNOWN	17,642	11,382
50	41	42	16,0	960,0	80,0	0,3365	KNOWN	2,801	1,807
68	43	55	30,0	1280,0	70,0	0,0269	KNOWN	6,915	4,461
41	44	45	30,0	2720,0	70,0	0,0572	KNOWN	1,592	1,027
69	55	44	30,0	1600,0	70,0	0,0336	KNOWN	4,604	2,971
40	46	45	30,0	1280,0	135,0	0,0080	KNOWN	0,242	0,156
39	45	47	16,0	2400,0	55,0	1,6828	KNOWN	0,870	0,561
38	46	51	20,0	1840,0	63,0	0,3385	KNOWN	1,680	1,084
72	47	48	20,0	5290,0	55,0	1,2512	KNOWN	1,328	0,857
37	51	47	20,0	800,0	55,0	0,1892	KNOWN	1,528	0,986
35	54	48	16,0	9100,0	55,0	6,3805	KNOWN	0,671	0,433
36	51	50	20,0	880,0	110,0	0,0577	KNOWN	0,153	0,099
79	54	50	20,0	1120,0	55,0	0,2649	KNOWN	1,444	0,931
70	55	52	16,0	3700,0	55,0	2,5943	KNOWN	1,597	1,030

TABLE - SLS29
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 41 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	140.5		120.5
3	81	8	0	0	20.0	8.758	5.650	KNOWN	140.5		120.5
4	9	0	0	0	20.0	21.793	14.060	KNOWN	139.8		119.8
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139.4		99.4
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	136.2		126.2
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	136.4		126.4
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	137.5		127.5
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	135.7		125.7
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139.2		119.2
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	138.5		118.5
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	138.7		103.7
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	129.7		94.7
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	135.8		120.8
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	133.9		118.9
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	135.2		115.2
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	132.4		117.4
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	127.6		97.6
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	119.0		79.0
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	135.3		125.3
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	121.6		111.6
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	128.0		113.0
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	129.8		119.8
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	124.4		109.4
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	125.0		115.0
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	125.4		115.4
29	65	66	63	71	15.0	0.000	0.000	KNOWN	127.0		112.0
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	127.8		117.8
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	132.5		122.5
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	135.5		125.5
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	127.6		107.6
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	128.1		108.1
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	127.4		117.4
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	128.2		118.2
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	128.9		113.9
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	129.7		114.7
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	129.7		114.7
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	130.2		110.2
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	134.2		99.2
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	132.0		117.0
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	124.6		114.6
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	123.7		108.7
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	121.4		106.4
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	121.4		101.4
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	119.4		59.4
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	117.1		92.1
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	135.3		115.3
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	119.6		49.6
51	38	37	36	0	60.0	0.000	0.000	KNOWN	119.7		59.7
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	117.8		107.8
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	108.5		88.5
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	119.7		99.7
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	124.0		114.0

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.452	1.582
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	19.500	12.581
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	22.342	14.414
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.301	4.065
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.478	0.309
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	25.895	16.707
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	48.0	4160.0	67.0	0.0234	KNOWN	12.683	8.183
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	27.014	17.429
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.489	0.315
47	8	18	48.0	3200.0	67.0	0.0180	KNOWN	8.863	5.718
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	23.502	15.162
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.351	0.226
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	18.121	11.691
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.822	1.176
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.727	0.469
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.525	0.339
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	18.870	12.174
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	17.979	11.599
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	33.810	21.813
18	14	15	24.0	3650.0	65.0	0.2630	KNOWN	6.722	4.337
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.448	0.934
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	6.218	4.011
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	13.422	8.660
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	17.646	11.385
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	10.424	6.725
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	20.886	13.475
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.124	0.725
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	15.631	10.084
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.640	1.058
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	8.212	5.298
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.265	0.171
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	4.820	3.110
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.628	1.050
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.115	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.875	3.790
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	12.444	8.029
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.335	1.506
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	2.238	1.444
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.237	1.443
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.144	0.738
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.570	0.368
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	6.005	3.874
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	5.942	3.834
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	4.049	2.613
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.500	0.323
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.617	2.979
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	3.180	2.052
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.548	0.999
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.707	0.456
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.182	4.633
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.122	3.305
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	6.064	3.913
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.548	0.353
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.699	1.096
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.786	1.798
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	2.137	1.379
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.855	0.552
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	4.310	2.780
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.010	0.651
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.952	0.614
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.375	0.887
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	7.153	4.615
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.180	0.116
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	8.650	5.581
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.513	1.621
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	16.854	10.874
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.706	1.746
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	5.318	3.431
41	44	45	30.0	2720.0	0.0	99.9999	KNOWN	0.001	0.001
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.008	1.941
40	45	46	30.0	1280.0	135.0	0.0080	KNOWN	2.034	1.312
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.105	0.713
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.409	1.554
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.382	0.891
37	51	47	20.0	[illegible]	55.0	1.1692	KNOWN	1.347	0.869
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.618	0.399
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.063	0.686
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.502	0.324
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE - SLS30
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 32 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	140.5		120.5
3	81	8	0	0	20.0	8.758	5.650	KNOWN	140.5		120.5
4	9	0	0	0	20.0	21.793	14.060	KNOWN	139.8		119.8
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139.4		99.4
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	136.2		126.2
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	136.4		126.4
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	137.5		127.5
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	135.7		125.7
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139.2		119.2
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	138.5		118.5
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	138.7		103.7
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	129.6		94.6
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	135.8		120.8
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	133.9		118.9
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	135.2		115.2
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	132.3		117.3
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	127.4		97.4
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	118.5		78.5
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	135.3		125.3
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	120.8		110.8
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	127.6		112.6
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	130.7		120.7
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	127.8		112.8
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	124.4		114.4
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	124.4		114.4
29	65	66	63	71	15.0	0.000	0.000	KNOWN	126.4		111.4
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	129.6		119.6
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	132.7		122.7
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	135.5		125.5
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	127.1		107.1
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	127.8		107.8
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	127.0		117.0
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	127.8		117.8
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	128.6		113.6
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	129.4		114.4
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	129.4		114.4
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	130.0		110.0
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	134.1		99.1
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	131.9		116.9
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	122.9		112.9
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	120.7		105.7
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	120.6		105.6
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	120.6		100.6
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	118.6		58.6
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	116.3		91.3
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	135.3		115.3
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	118.8		48.8
51	38	37	36	0	60.0	0.000	0.000	KNOWN	118.9		58.9
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	115.4		105.4
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	108.0		88.0
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	118.9		98.9
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	121.6		111.6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.453	1.583
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	19.493	12.576
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	22.346	14.417
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.325	4.067
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.477	0.308
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	25.900	16.710
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	48.0	4160.0	67.0	0.0234	KNOWN	12.689	8.187
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	27.000	17.419
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.495	0.319
47	8	18	48.0	3200.0	67.0	0.0180	KNOWN	8.875	5.726
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	23.490	15.155
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.351	0.226
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	18.102	11.679
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.821	1.175
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.722	0.465
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.527	0.340
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	18.872	12.176
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	17.932	11.569
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	33.766	21.785
18	14	15	24.0	3650.0	65.0	0.2630	KNOWN	6.775	4.371
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.469	0.948
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	6.291	4.058
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	13.523	8.725
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	17.499	11.290
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	10.514	[illegible]
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	21.365	13.784
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.147	0.740
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	16.129	10.406
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.665	1.074
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	8.509	5.490
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.507	0.327
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	4.916	3.173
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.530	0.987
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.116	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.309	3.425
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	12.388	7.992
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.848	1.837
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	2.655	1.713
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.242	1.446
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.560	1.006
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.633	0.408
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	6.576	4.243
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	6.160	3.974
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.067	1.979
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	1.362	0.879
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	3.300	2.129
32	26	46	20.0	1760.0	0.0	99.9999	KNOWN	0.001	0.001
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.462	0.297
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	1.481	0.956
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	8.104	5.228
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	7.132	4.601
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	6.812	4.395
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.659	0.425
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.365	0.881
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.693	1.737
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	2.313	1.492
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.897	0.579
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	4.527	2.921
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.080	0.697
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.979	0.632
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.416	0.915
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	7.397	[illegible]
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.147	0.095
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	8.862	5.717
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.589	1.670
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	17.264	11.151
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.759	[illegible]
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	[illegible]	[illegible]
41	44	45	30.0	2720.0	135.0	0.0170	KNOWN	2.922	1.885
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	5.792	3.737
40	45	46	30.0	1280.0	135.0	0.0080	KNOWN	0.596	0.384
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.106	0.713
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.388	1.541
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.381	0.891
37	51	47	20.0	[illegible]	55.0	1.1692	KNOWN	1.344	0.867
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.619	0.399
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.052	0.679
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.545	0.351
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE - SLS31
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 42 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	140.5		120.5
3	81	8	0	0	20.0	8.758	5.650	KNOWN	140.6		120.6
4	9	0	0	0	20.0	21.793	14.060	KNOWN	139.9		119.9
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139.4		99.4
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	136.2		126.2
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	136.4		126.4
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	137.5		127.5
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	135.7		125.7
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139.3		119.3
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	138.6		118.6
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	138.7		103.7
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	130.0		95.0
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	135.8		120.8
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	134.0		119.0
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	135.1		115.1
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	132.6		117.6
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	128.0		98.0
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	119.9		79.9
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	135.3		125.3
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	122.9		112.9
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	127.8		112.8
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	129.4		119.4
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	123.4		108.4
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	124.6		114.6
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	125.0		115.0
29	65	66	63	71	15.0	0.000	0.000	KNOWN	126.7		111.7
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	127.3		117.3
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	132.6		122.6
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	135.5		125.5
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	127.3		107.3
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	127.9		107.9
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	127.1		117.1
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	127.9		117.9
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	128.7		113.7
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	129.5		114.5
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	129.5		114.5
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	130.1		110.1
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	134.1		99.1
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	132.0		117.0
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	124.0		114.0
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	122.8		107.8
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	122.8		107.8
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	122.8		102.8
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	120.7		60.7
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	118.5		93.5
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	135.3		115.3
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	121.0		51.0
51	38	37	36	0	60.0	0.000	0.000	KNOWN	121.1		61.1
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	117.0		107.0
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	109.4		89.4
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	121.1		101.1
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	123.2		113.2

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.478	1.599
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	19.567	12.624
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	22.298	14.386
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.280	4.052
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.484	0.312
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	25.868	16.689
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.711	8.201
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	27.052	17.453
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.493	0.318
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.895	5.739
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	23.547	15.192
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.347	0.224
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	18.165	11.719
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.816	1.172
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.728	0.470
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.535	0.345
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	18.829	12.148
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	18.052	11.646
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	33.842	21.834
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	6.623	4.273
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.419	0.915
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	6.089	3.928
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	13.064	8.428
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	18.026	11.629
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	10.095	6.513
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	21.179	13.664
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.138	0.734
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	15.923	10.273
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.612	1.040
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.736	4.991
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.080	0.052
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	4.663	3.008
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.785	1.152
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.116	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	6.066	3.914
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	12.875	8.306
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.574	1.661
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	1.661	1.072
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.213	1.427
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.118	0.721
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.587	0.378
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	6.126	3.952
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	6.106	3.939
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	4.266	2.752
42	27	26	16.0	3200.0	0.0	99.9999	KNOWN	0.000	0.000
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.958	3.199
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	3.021	1.949
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.304	0.841
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.963	0.621
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.473	4.821
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.659	3.651
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	6.291	4.059
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.598	0.386
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.823	1.176
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.735	1.764
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	2.242	1.446
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.871	0.562
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	4.431	2.859
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.044	0.673
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.965	0.622
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.397	0.901
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	7.286	4.701
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.154	0.100
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	8.758	5.650
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.560	1.652
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	17.128	11.050
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.739	1.767
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.110	3.942
41	44	45	30.0	2720.0	135.0	0.0170	KNOWN	0.661	0.426
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.801	2.452
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	1.251	0.807
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.114	0.719
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.424	1.564
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.382	0.892
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.337	0.863
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.617	0.398
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.086	0.701
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.510	0.329
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE - SLS32
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 31 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	140.5		120.5
3	81	8	0	0	20.0	8.758	5.650	KNOWN	140.5		120.5
4	9	0	0	0	20.0	21.793	14.060	KNOWN	139.8		119.8
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139.4		99.4
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	136.2		126.2
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	136.4		126.4
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	137.5		127.5
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	135.7		125.7
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139.2		119.2
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	138.5		118.5
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	138.7		103.7
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	129.2		94.2
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	135.8		120.8
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	133.8		118.8
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	135.1		115.1
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	132.2		117.2
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	126.9		96.9
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	117.1		77.1
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	135.4		125.4
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	118.7		108.7
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	126.4		111.4
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	133.0		123.0
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	118.3		103.3
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	120.0		110.0
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	121.4		111.4
29	65	66	63	71	15.0	0.000	0.000	KNOWN	124.6		109.6
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	133.0		123.0
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	133.4		123.4
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	135.5		125.5
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	125.7		105.7
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	126.6		106.6
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	125.6		115.6
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	126.8		116.8
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	127.6		112.6
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	128.6		113.6
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	128.6		113.6
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	129.3		109.3
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	134.0		99.0
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	131.5		116.5
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	119.9		109.9
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	118.4		103.4
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	118.3		103.3
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	118.3		98.3
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	116.3		56.3
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	114.1		89.1
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	135.3		115.3
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	116.6		46.6
51	38	37	36	0	60.0	0.000	0.000	KNOWN	116.7		56.7
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	112.8		102.8
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	106.6		86.6
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	116.7		96.7
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	118.9		108.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.445	1.578
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	19.479	12.567
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	22.352	14.421
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.312	4.072
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.473	0.305
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	25.912	16.717
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.712	8.201
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	26.964	17.396
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.513	0.331
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.916	5.752
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	23.458	15.134
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.349	0.225
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	18.054	11.648
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.816	1.172
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.725	0.468
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.536	0.346
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	18.876	12.178
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	17.794	11.480
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	33.632	21.698
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	6.925	4.467
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.524	0.983
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	6.495	4.190
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	13.883	8.957
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	16.997	10.966
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	10.807	6.972
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	22.781	14.698
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.215	0.784
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	17.576	11.340
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.729	1.115
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	9.258	5.973
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	1.015	0.655
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	5.186	3.346
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.262	0.814
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.116	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	3.692	2.382
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	12.265	7.913
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	4.343	2.802
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	3.622	2.337
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.297	1.482
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	2.354	1.518
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.785	0.507
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	7.906	5.101
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	6.850	4.419
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	0.656	0.423
42	27	26	16.0	3200.0	135.0	0.4261	KNOWN	2.101	1.355
31	30	26	20.0	1600.0	0.0	99.9999	KNOWN	0.001	0.001
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	0.325	0.210
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	2.826	1.823
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.379	0.244
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	10.385	6.700
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	7.050	4.549
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	8.655	5.584
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.945	0.610
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	0.476	0.307
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.313	1.492
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	2.827	1.824
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.998	0.644
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	5.142	3.317
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.265	0.816
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.048	0.676
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.534	0.990
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	8.080	5.213
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.040	0.026
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	9.438	6.089
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.812	1.814
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	18.550	11.968
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.914	1.880
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.918	4.463
41	44	45	30.0	2720.0	135.0	0.0170	KNOWN	1.602	1.034
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	4.610	2.974
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	0.422	0.272
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.094	0.706
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.359	1.522
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.379	0.889
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.354	0.873
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.621	0.401
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.005	0.649
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.591	0.381
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE - SLS33
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 76 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	140.5		120.5
3	81	8	0	0	20.0	8.758	5.650	KNOWN	140.5		120.5
4	9	0	0	0	20.0	21.793	14.060	KNOWN	139.8		119.8
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139.3		99.3
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	136.2		126.2
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	136.4		126.4
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	137.5		127.5
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	135.6		125.6
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139.2		119.2
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	138.5		118.5
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	138.7		103.7
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	129.3		94.3
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	135.8		120.8
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	133.6		118.6
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	135.2		115.2
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	131.8		116.8
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	127.1		97.1
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	118.0		78.0
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	135.4		125.4
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	120.1		110.1
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	127.1		112.1
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	133.7		123.7
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	120.1		105.1
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	121.4		111.4
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	122.6		112.6
29	65	66	63	71	15.0	0.000	0.000	KNOWN	125.4		110.4
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	120.3		110.3
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	131.6		121.6
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	135.5		125.5
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	126.4		106.4
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	127.2		107.2
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	126.2		116.2
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	127.3		117.3
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	128.1		113.1
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	129.0		114.0
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	129.0		114.0
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	129.7		109.7
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	134.1		99.1
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	131.7		116.7
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	121.3		111.3
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	120.0		105.0
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	119.9		104.9
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	119.9		99.9
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	117.9		57.9
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	115.6		90.6
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	135.3		115.3
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	118.2		48.2
51	38	37	36	0	60.0	0.000	0.000	KNOWN	118.2		58.2
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	114.3		104.3
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	107.5		87.5
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	118.3		98.3
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	120.4		110.4

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.427	1.566
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	19.409	12.522
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	22.403	14.454
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.331	4.084
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.471	0.304
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	25.933	16.731
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.673	8.176
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	26.932	17.376
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.504	0.325
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.868	5.721
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	23.411	15.104
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.358	0.231
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	18.009	11.618
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.831	1.182
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.726	0.468
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.511	0.329
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	18.924	12.209
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	17.872	11.531
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	33.759	21.780
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	6.867	4.430
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.467	0.946
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	6.381	4.116
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	14.412	9.298
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	16.620	10.723
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	11.393	7.350
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	22.109	14.264
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.183	0.763
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	16.918	10.915
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.628	1.050
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	8.557	5.520
25	19	31	16.0	2000.0	60.0	1.1938	KNOWN	0.372	0.240
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	4.971	3.207
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.477	0.953
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.115	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	3.049	1.967
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	11.012	7.104
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	3.731	2.407
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	2.750	1.774
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.253	1.454
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	2.365	1.526
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.743	0.479
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	7.593	4.898
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	6.483	4.182
76	25	30	20.0	800.0	0.0	99.9999	KNOWN	0.002	0.001
42	27	26	16.0	3200.0	135.0	0.4261	KNOWN	1.840	1.187
31	30	26	20.0	1600.0	135.0	0.0719	KNOWN	1.561	1.007
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	1.517	0.979
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	2.596	1.675
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.415	0.268
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	9.689	6.251
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	6.582	4.246
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	8.106	5.230
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.839	0.541
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	2.744	1.771
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	3.194	2.061
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	2.591	1.672
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.965	0.622
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	4.873	3.144
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.192	0.769
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.023	0.660
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.487	0.959
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	7.786	5.024
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.097	0.063
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	9.201	5.936
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.708	1.747
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	17.946	11.578
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.841	1.833
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.485	4.184
41	44	45	30.0	2720.0	135.0	0.0170	KNOWN	1.158	0.754
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	4.175	2.694
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	0.867	0.559
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.105	0.713
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.393	1.544
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.380	0.891
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.345	0.868
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.619	0.399
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.048	0.676
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.549	0.354
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.596	1.030

TABLE - SLS34
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 30 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	140.5		120.5
3	81	8	0	0	20.0	8.758	5.650	KNOWN	140.5		120.5
4	9	0	0	0	20.0	21.793	14.060	KNOWN	139.8		119.8
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139.4		99.4
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	136.2		126.2
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	136.4		126.4
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	137.5		127.5
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	135.7		125.7
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139.2		119.2
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	138.5		118.5
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	138.7		103.7
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	129.2		94.2
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	135.8		120.8
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	133.6		118.6
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	135.1		115.1
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	131.7		116.7
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	127.0		97.0
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	117.6		77.6
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	135.4		125.4
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	119.5		109.5
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	124.2		109.2
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	120.1		110.1
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	119.6		104.6
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	120.3		110.3
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	121.1		111.1
29	65	66	63	71	15.0	0.000	0.000	KNOWN	123.2		108.2
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	120.0		110.0
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	131.6		121.6
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	135.6		125.6
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	123.8		103.8
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	125.2		105.2
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	124.3		114.3
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	125.5		115.5
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	126.4		111.4
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	127.5		112.5
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	127.5		112.5
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	128.2		108.2
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	133.8		98.8
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	131.0		116.0
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	120.1		110.1
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	119.2		104.2
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	119.2		104.2
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	119.2		99.2
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	117.2		57.2
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	114.9		89.9
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	135.3		115.3
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	117.5		47.5
51	38	37	36	0	60.0	0.000	0.000	KNOWN	117.5		57.5
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	113.3		103.3
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	107.0		87.0
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	117.6		97.6
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	119.5		109.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.446	1.578
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	19.479	12.567
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	22.352	14.421
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.312	4.072
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.473	0.305
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	25.911	16.717
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.749	8.225
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	26.927	17.372
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.539	0.348
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.979	5.793
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	23.420	15.110
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.351	0.226
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	17.989	11.606
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.817	1.172
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.725	0.468
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.533	0.344
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	18.876	12.178
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	17.797	11.482
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	33.635	21.700
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	6.921	4.465
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.484	0.957
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	6.453	4.163
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	14.642	9.447
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	16.243	10.480
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	11.608	7.489
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	24.696	15.933
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.304	0.841
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	19.516	12.591
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.642	1.059
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	8.785	5.668
25	19	31	16.0	2000.0	60.0	1.1938	KNOWN	0.345	0.223
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	5.056	3.262
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.392	0.898
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.116	2.010
30	22	25	20.0	1040.0	0.0	99.9999	KNOWN	0.002	0.001
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	10.581	6.826
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	6.348	4.095
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	3.047	1.966
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.269	1.464
43	24	25	16.0	2560.0	64.0	1.3561	KNOWN	1.820	1.174
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.574	0.370
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	5.336	3.443
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	8.231	5.310
76	25	30	20.0	800.0	135.0	0.0359	KNOWN	1.111	0.717
42	27	26	16.0	3200.0	135.0	0.4261	KNOWN	1.339	0.864
31	30	26	20.0	1600.0	135.0	0.0719	KNOWN	2.775	1.790
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	2.177	1.404
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	2.123	1.370
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.445	0.287
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	8.218	5.302
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.581	3.601
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	6.656	4.294
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.977	0.630
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	2.767	1.785
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	3.244	2.093
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	3.415	2.203
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.957	0.617
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	5.693	3.673
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.337	0.862
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.056	0.681
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.598	1.031
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	8.637	5.572
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.180	0.116
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	9.767	6.301
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	3.095	1.997
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	20.279	13.078
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	3.109	2.006
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	5.514	3.558
41	44	45	30.0	2720.0	135.0	0.0170	KNOWN	0.443	0.286
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.205	2.068
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	1.832	1.182
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.097	0.708
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.385	1.538
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.380	0.890
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.352	0.872
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.620	0.400
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.033	0.666
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.564	0.364
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE - SLS35
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPES 77 & 78 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,6		120,6
3	81	8	0	0	20.0	8,758	5,650	KNOWN	140,6		120,6
4	9	0	0	0	20.0	21,793	14,060	KNOWN	139,9		119,9
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,4		99,4
6	2	6	1	3	10.0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10.0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10.0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,7		125,7
12	7	80	13	11	20.0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20.0	-3,038	-1,960	KNOWN	138,6		118,6
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,8		103,8
15	18	19	73	0	35.0	-1,953	-1,260	KNOWN	130,6		95,6
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,9		120,9
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	134,3		119,3
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,1		115,1
19	74	20	24	25	15.0	-0,837	-0,540	KNOWN	133,2		118,2
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	128,7		98,7
21	21	23	22	0	40.0	-3,333	-2,150	KNOWN	121,6		81,6
22	30	29	44	0	10.0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	125,6		115,6
24	43	65	64	52	15.0	-0,511	-0,330	KNOWN	129,2		114,2
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,1		122,1
26	42	31	32	0	15.0	-1,938	-1,250	KNOWN	127,4		112,4
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	127,4		117,4
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	127,2		117,2
29	65	66	63	71	15,0	0,000	0,000	KNOWN	128,4		113,4
30	76	31	82	0	10.0	-1,131	-0,730	KNOWN	130,6		120,6
31	25	82	27	0	10.0	-0,821	-0,530	KNOWN	133,3		123,3
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,5		125,5
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	128,8		108,8
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,2		109,2
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	128,5		118,5
36	59	58	57	0	10.0	-1.318	-0,850	KNOWN	129,1		119,1
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	129,7		114,7
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,4		115,4
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,4		115,4
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	130,9		110,9
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,3		99,3
42	49	54	50	0	15,0	-1.318	-0,850	KNOWN	132,4		117,4
43	77	67	68	0	10.0	-0.511	-0,330	KNOWN	126,3		116,3
44	41	69	0	0	15,0	-3.007	-1.940	KNOWN	125,6		110,6
45	41	40	39	0	15.0	-0,930	-0,600	KNOWN	125,6		110,6
46	33	32	40	38	20,0	-1.007	-0.650	KNOWN	125,6		105,6
47	39	72	37	0	60,0	-1,069	-0.690	KNOWN	123,5		63,5
48	72	35	0	0	25.0	-1.999	-1,290	KNOWN	121.2		96.2
49	46	48	44	0	20.0	-4,820	-3.110	KNOWN	135,3		115,3
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	123,8		53,8
51	38	37	36	0	60.0	0,000	0,000	KNOWN	123,8		63,8
52	70	0	0	0	10.0	-1,596	-1,030	KNOWN	119,6		109,6
53	22	0	0	0	20.0	-3,115	-2,010	KNOWN	111,1		91,1
54	34	35	79	0	20.0	-1,085	-0,700	KNOWN	123,8		103,8
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	125,8		115,8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880,0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48.0	800,0	86,0	0,0012	KNOWN	2,525	1,629
6	2	6	48.0	4960.0	86,0	0,0072	KNOWN	19,711	12,717
7	2	12	48.0	1920.0	70,0	0,0041	KNOWN	22,200	14,322
8	3	5	30,0	1600,0	65,0	0,0386	KNOWN	6,231	4,020
9	4	5	48.0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16.0	1280,0	75,0	0,5056	KNOWN	0,496	0,320
10	5	14	48,0	2080,0	120,0	0,0016	KNOWN	25,827	16,662
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40,0	4160.0	67,0	0,0234	KNOWN	12,733	8,215
4	6	10	48,0	1920,0	86,0	0,0028	KNOWN	27,175	17,532
16	9	8	16.0	592.0	40,0	0,7482	KNOWN	0,473	0,305
47	8	18	40.0	3200.0	67,0	0,0180	KNOWN	8,897	5,740
5	10	9	48,0	2240,0	86,0	0,0033	KNOWN	23,684	15,280
15	9	11	16.0	4000.0	40,0	5,0552	KNOWN	0,336	0,217
46	9	49	48.0	3350,0	85,0	0.0050	KNOWN	18,337	11,830
14	10	11	24.0	2720,0	35,0	0,6109	KNOWN	1,801	1.162
13	12	11	16.0	5120.0	40,0	6,4706	KNOWN	0,730	0,471
28	16	11	24.0	1650.0	30,0	0.4929	KNOWN	0,558	0.360
11	12	13	48.0	1440,0	70,0	0,0031	KNOWN	18,741	12,091
12	14	13	48.0	960.0	120,0	0.0008	KNOWN	18,197	11,740
17	13	16	48.0	5120.0	120,0	0,0040	KNOWN	33,919	21,883
18	14	15	24.0	3680,0	65,0	0,2630	KNOWN	6,396	4,127
19	17	15	16.0	3840.0	63,0	2,0943	KNOWN	1,368	0,883
73	15	20	24.0	1040.0	66,0	0.0722	KNOWN	5,811	3,749
75	16	17	30,0	950,0	80,0	0,0156	KNOWN	11,853	7,647
26	16	32	48.0	1950.0	120,0	0,0015	KNOWN	19,294	12,448
74	17	19	30.0	1200.0	80,0	0,0197	KNOWN	8,946	5,772
45	18	41	48,0	4550,0	120,0	0,0036	KNOWN	19,406	12,520
49	18	42	16.0	5600.0	70,0	2,5133	KNOWN	1,054	0,680
48	49	18	48.0	640.0	85,0	0,0010	KNOWN	14,044	9,061
20	19	20	16,0	3200,0	60,0	1,9101	KNOWN	1,585	1,023
24	19	23	30,0	5600.0	50,0	0,2193	KNOWN	6,774	4,370
25	31	19	16.0	2000.0	60,0	1.1938	KNOWN	0,260	0,168
21	20	21	24.0	6720,0	66,0	0,4668	KNOWN	4,359	2,812
23	23	21	20.0	5120.0	60,0	1,0309	KNOWN	2,089	1,348
22	21	53	20.0	8470.0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20,0	1040.0	135,0	0,0467	KNOWN	9,753	6,293
29	32	22	48.0	1920.0	120,0	0,0015	KNOWN	14,529	9.374
44	22	49	48.0	3840.0	120,0	0,0030	KNOWN	0,787	0,508
33	23	46	30,0	4800,0	135,0	0,0299	KNOWN	0,311	0,201
34	23	54	20.0	1760.0	55,0	0,4163	KNOWN	2,187	1,411
43	25	24	16.0	2560.0	64,0	1,3561	KNOWN	1,505	0.971
65	24	29	16,0	3360,0	50,0	2,8102	KNOWN	0,508	0,328
64	24	33	36,0	2400.0	80,0	0.0162	KNOWN	5,621	3,627
52	40	24	30.0	4960.0	80,0	0.0814	KNOWN	5,136	3,314
76	25	30	20,0	800,0	135,0	0,0359	KNOWN	7,566	4,882
42	26	27	16.0	3200.0	135,0	0,4261	KNOWN	0,327	0,211
31	30	26	20.0	1600.0	135,0	0.0719	KNOWN	7,705	4,971
32	26	46	20.0	1760.0	135,0	0,0791	KNOWN	5,425	3,500
78	27	28	16.0	450.0	0,0	99,9999	KNOWN	0,000	0,000
77	27	43	16.0	1600.0	0,0	99,9999	KNOWN	0,000	0,000
66	29	28	30,0	2000,0	70,0	0,0420	KNOWN	5,998	3,870
67	28	43	30.0	1920.0	70,0	0,0403	KNOWN	5,487	3,540
63	33	29	30.0	800.0	65,0	0,0193	KNOWN	5,171	3,336
71	35	29	16,0	3200,0	80,0	1,1218	KNOWN	0,308	0,199
82	31	30	16.0	3900.0	70,0	1.7503	KNOWN	1,268	0,818
27	32	31	20.0	1600.0	50,0	0.4514	KNOWN	2,347	1,514
62	34	33	24,0	1920,0	65,0	0,1372	KNOWN	1,637	1,056
60	34	35	16.0	2800.0	80,0	0,9816	KNOWN	0,780	0,503
61	37	34	24.0	880.0	75,0	0,0483	KNOWN	3,734	2,409
59	36	35	16,0	2080,0	80,0	0,7292	KNOWN	0,848	0,547
58	37	36	16.0	2230.0	80,0	0,7818	KNOWN	0,894	0,577
57	39	36	16.0	2400.0	80,0	0,8414	KNOWN	1,271	0,820
56	38	37	30,0	1280,0	80,0	0,0210	KNOWN	6,519	4,206
55	38	39	30.0	560.0	80,0	0,0092	KNOWN	0,304	0,196
53	40	38	30.0	640.0	80,0	0,0105	KNOWN	8,141	5,252
54	42	39	16,0	960.0	70,0	0,4309	KNOWN	2,284	1,474
51	41	40	30.0	1280.0	80,0	0,0210	KNOWN	15,540	10,026
50	41	42	16.0	960.0	80,0	0,3365	KNOWN	2,548	1,644
68	43	55	30,0	1280,0	70,0	0,0269	KNOWN	4,989	3,219
41	45	44	30.0	2720.0	135,0	0.0170	KNOWN	0,279	0.180
69	55	44	30.0	1600.0	70,0	0,0336	KNOWN	2,667	1.721
40	46	45	30,0	1280.0	135,0	0,0080	KNOWN	2,384	1,538
39	45	47	16.0	2400.0	55,0	1.6828	KNOWN	1.114	0.719
38	46	51	20.0	1840.0	63,0	0.3385	KNOWN	2,443	1.576
72	47	48	20.0	5290.0	55,0	1,2512	KNOWN	1,383	0,892
37	51	47	20.0	800.0	55,0	0,1892	KNOWN	1,338	0,863
35	54	48	16.0	9100.0	55,0	6.3805	KNOWN	0,616	0,398
36	51	50	20.0	880.0	110,0	0.0577	KNOWN	1,106	0,713
79	54	50	20.0	1120.0	55,0	0.2649	KNOWN	0,484	0.312
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1,597	1,030

TABLE - SLS36
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 69 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,6		120,6
3	81	8	0	0	20.0	8,758	5,650	KNOWN	140,6		120,6
4	9	0	0	0	20.0	21,793	14,060	KNOWN	139,9		119,9
5	8	9	80	10	40.0	-1,720	-1,110	KNOWN	139,4		99,4
6	2	6	1	3	10.0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,7		125,7
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,6		118,6
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,7		103,7
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	130,3		95,3
16	28	17	75	26	15.0	-2,216	-1,430	KNOWN	135,8		120,8
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	134,2		119,2
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,2		115,2
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	132,9		117,9
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	128,3		98,3
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	120,7		80,7
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	124,1		114,1
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	129,8		114,8
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,1		122,1
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	127,2		112,2
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	128,0		118,0
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	128,2		118,2
29	65	66	63	71	15,0	0,000	0,000	KNOWN	129,1		114,1
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	130,5		120,5
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	133,1		123,1
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,5		125,5
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	129,4		109,4
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,7		109,7
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	129,1		119,1
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	129,6		119,6
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	130,1		115,1
38	56	55	53	0	15,0	-1.318	-0,850	KNOWN	130,8		115,8
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,8		115,8
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	131,2		111,2
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,4		99,4
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,6		117,6
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	128,0		118,0
44	41	69	0	0	15,0	-3.007	-1,940	KNOWN	123,8		108,8
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	123,9		108,9
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	124,1		104,1
47	39	72	37	0	60,0	-1,069	-0.690	KNOWN	121,9		61,9
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	119,7		94,7
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,3		115,3
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	122,2		52,2
51	38	37	36	0	60,0	0,000	0,000	KNOWN	122,3		62,3
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	121,7		111,7
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	110,1		90,1
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	122,3		102,3
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	127,9		117,9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48,0	2880,0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48,0	800,0	86,0	0,0012	KNOWN	2,497	1,611
6	2	6	48,0	4960,0	86,0	0,0072	KNOWN	19,622	12,659
7	2	12	48,0	1920,0	70,0	0.0041	KNOWN	22,260	14,361
8	3	5	30,0	1600,0	65,0	0,0386	KNOWN	6,261	4,039
9	4	5	48,0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16,0	1280,0	75,0	0,5056	KNOWN	0,489	0,315
10	5	14	48,0	2080,0	120,0	0,0016	KNOWN	25,845	16,674
1	7	6	16,0	11700,0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40,0	4160,0	67,0	0,0234	KNOWN	12,691	8,188
4	6	10	48,0	1920,0	86,0	0,0028	KNOWN	27,130	17,503
16	9	8	16,0	592,0	40,0	0,7482	KNOWN	0,463	0,299
47	8	18	40,0	3200,0	67,0	0,0180	KNOWN	8,846	5,707
5	10	9	48,0	2240,0	86,0	0,0033	KNOWN	23,630	15,245
15	9	11	16,0	4000,0	40,0	5,0552	KNOWN	0,342	0,221
46	9	49	48,0	3350,0	85,0	0,0050	KNOWN	18,275	11,790
14	10	11	24,0	2720,0	35,0	0,6109	KNOWN	1,811	1,168
13	12	11	16,0	5120,0	40,0	6,4706	KNOWN	0,729	0,470
28	16	11	24,0	1650,0	30,0	0,4929	KNOWN	0,543	0,350
11	12	13	48,0	1440,0	70,0	0,0031	KNOWN	18,796	12,126
12	14	13	48,0	960,0	120,0	0,0008	KNOWN	18,139	11,703
17	13	16	48,0	5120,0	120,0	0,0040	KNOWN	33,897	21,869
18	14	15	24,0	3680,0	65,0	0,2630	KNOWN	6,512	4,201
19	17	15	16,0	3840,0	63,0	2,0943	KNOWN	1,399	0,902
73	15	20	24,0	1040,0	66,0	0,0722	KNOWN	5,958	3,844
75	16	17	30,0	950,0	80,0	0,0156	KNOWN	12,373	7,983
26	16	32	48,0	1950,0	120,0	0,0015	KNOWN	18,744	12,093
74	17	19	30,0	1200,0	80,0	0,0197	KNOWN	9,425	6,081
45	18	41	48,0	4550,0	120,0	0,0036	KNOWN	18,688	12,057
49	18	42	16,0	5600,0	70,0	2,5133	KNOWN	1,019	0,658
48	49	18	48,0	640,0	85,0	0,0010	KNOWN	13,357	8,618
20	19	20	16,0	3200,0	60,0	1,9101	KNOWN	1,610	1,039
24	19	23	30,0	5600,0	50,0	0,2193	KNOWN	7,354	4,745
25	31	19	16,0	2000,0	60,0	1,1938	KNOWN	0,376	0,242
21	20	21	24,0	6720,0	66,0	0,4668	KNOWN	4,530	2,922
23	23	21	20,0	5120,0	60,0	1,0309	KNOWN	1,918	1,238
22	21	53	20,0	8470,0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20,0	1040,0	135,0	0,0467	KNOWN	9,776	6,307
29	32	22	48,0	1920,0	120,0	0,0015	KNOWN	13,931	8,988
44	49	22	48,0	3840,0	120,0	0,0030	KNOWN	0,236	0,152
33	23	46	30,0	4800,0	135,0	0,0299	KNOWN	1,146	0,740
34	23	54	20,0	1760,0	55,0	0,4163	KNOWN	2,213	1,428
43	25	24	16,0	2560,0	64,0	1,3561	KNOWN	1,344	0,867
65	24	29	16,0	3360,0	50,0	2,8102	KNOWN	0,453	0,293
64	24	33	36,0	2400,0	80,0	0,0162	KNOWN	5,165	3,332
52	40	24	30,0	4960,0	80,0	0,0814	KNOWN	4,786	3,087
76	25	30	20,0	800,0	135,0	0,0359	KNOWN	7,751	5,001
42	27	26	16,0	3200,0	135,0	0,4261	KNOWN	1,408	0,909
31	30	26	20,0	1600,0	135,0	0,0719	KNOWN	7,863	5,073
32	26	46	20,0	1760,0	135,0	0,0791	KNOWN	7,334	4,732
78	28	27	16,0	450,0	135,0	0,0599	KNOWN	2,000	1,291
77	27	43	16,0	1600,0	135,0	0,2131	KNOWN	0,244	0,157
66	29	28	30,0	2000,0	70,0	0,0420	KNOWN	5,084	3,280
67	28	43	30,0	1920,0	70,0	0,0403	KNOWN	2,571	1,659
63	33	29	30,0	800,0	65,0	0,0193	KNOWN	4,484	2,893
71	35	29	16,0	3200,0	80,0	1,1218	KNOWN	0,147	0,095
82	31	30	16,0	3900,0	70,0	1,7503	KNOWN	1,244	0,802
27	32	31	20,0	1600,0	50,0	0,4514	KNOWN	2,441	1,575
62	34	33	24,0	1920,0	65,0	0,1372	KNOWN	1,396	0,901
60	34	35	16,0	2800,0	80,0	0,9816	KNOWN	0,719	0,464
61	37	34	24,0	880,0	75,0	0,0483	KNOWN	3,433	2,215
59	36	35	16,0	2080,0	80,0	0,7292	KNOWN	0,745	0,481
58	37	36	16,0	2230,0	80,0	0,7818	KNOWN	0,854	0,551
57	39	36	16,0	2400,0	80,0	0,8414	KNOWN	1,208	0,780
56	38	37	30,0	1280,0	80,0	0,0210	KNOWN	6,178	3,986
55	38	39	30,0	560,0	80,0	0,0092	KNOWN	0,355	0,229
53	40	38	30,0	640,0	80,0	0,0105	KNOWN	7,851	5,065
54	42	39	16,0	960,0	70,0	0,4309	KNOWN	2,171	1,400
51	41	40	30,0	1280,0	80,0	0,0210	KNOWN	14,899	9,612
50	41	42	16,0	960,0	80,0	0,3365	KNOWN	2,469	1,593
68	43	55	30,0	1280,0	70,0	0,0269	KNOWN	2,311	1,491
41	45	44	30,0	2720,0	135,0	0,0170	KNOWN	3,005	1,939
69	55	44	30,0	1600,0	0,0	99,9999	KNOWN	0,002	0,001
40	46	45	30,0	1280,0	135,0	0,0080	KNOWN	5,021	3,239
39	45	47	16,0	2400,0	55,0	1,6828	KNOWN	1,086	0,701
38	46	51	20,0	1840,0	63,0	0,3385	KNOWN	2,452	1,582
72	47	48	20,0	5290,0	55,0	1,2512	KNOWN	1,381	0,891
37	51	47	20,0	800,0	55,0	0,1892	KNOWN	1,365	0,880
35	54	48	16,0	9100,0	55,0	6,3805	KNOWN	0,618	0,399
36	51	50	20,0	880,0	110,0	0,0577	KNOWN	1,087	0,701
79	54	50	20,0	1120,0	55,0	0,2649	KNOWN	0,509	0,329
70	55	52	16,0	3700,0	55,0	2,5943	KNOWN	1,597	1,030

TABLE - SLS37
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 67 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,6		120,6
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,6		120,6
4	9	0	0	0	20,0	21,793	14,060	KNOWN	139,9		119,9
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,4		99,4
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,7		125,7
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,6		118,6
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,7		103,7
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	130,4		95,4
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,8		120,8
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	134,2		119,2
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,2		115,2
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	133,0		118,0
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	128,4		98,4
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	120,9		80,9
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	124,5		114,5
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	129,7		114,7
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,0		122,0
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	127,0		112,0
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	127,1		117,1
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	128,2		118,2
29	65	66	63	71	15,0	0,000	0,000	KNOWN	129,0		114,0
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	130,4		120,4
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	133,1		123,1
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,5		125,5
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	129,4		109,4
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,6		109,6
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	129,1		119,1
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	129,5		119,5
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	130,1		115,1
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,7		115,7
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,7		115,7
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	131,2		111,2
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,3		99,3
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,5		117,5
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	124,6		114,6
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	124,3		109,3
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	124,4		109,4
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	124,5		104,5
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	122,4		62,4
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	120,1		95,1
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,3		115,3
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	122,6		52,6
51	38	37	36	0	60,0	0,000	0,000	KNOWN	122,7		62,7
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	118,2		108,2
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	110,4		90,4
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	122,7		102,7
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	124,3		114,3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48.0	800.0	86,0	0,0012	KNOWN	2,504	1,615
6	2	6	48.0	4960.0	86,0	0,0072	KNOWN	19,643	12,673
7	2	12	48.0	1920.0	70,0	0,0041	KNOWN	22,246	14,352
8	3	5	30.0	1600.0	65,0	0,0386	KNOWN	6,254	4,035
9	4	5	48.0	2000.0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,490	0,316
10	5	14	48.0	2080.0	120,0	0,0016	KNOWN	25,836	16,668
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40.0	4160.0	67,0	0,0234	KNOWN	12,699	8,193
4	6	10	48.0	1920.0	86,0	0,0028	KNOWN	27,141	17,510
16	9	8	16.0	592.0	40,0	0,7482	KNOWN	0,465	0,300
47	8	18	40.0	3200.0	67,0	0,0180	KNOWN	8,855	5,713
5	10	9	48.0	2240.0	86,0	0,0033	KNOWN	23,642	15,253
15	9	11	16.0	4000.0	40,0	5,0552	KNOWN	0,341	0,220
46	9	49	48.0	3350.0	85,0	0,0050	KNOWN	18,295	11,803
14	10	11	24.0	2720.0	35,0	0,6109	KNOWN	1,809	1,167
13	12	11	16.0	5120.0	40,0	6,4706	KNOWN	0,729	0,471
28	16	11	24.0	1650.0	30,0	0,4929	KNOWN	0,546	0,353
11	12	13	48.0	1440.0	70,0	0,0031	KNOWN	18,783	12,118
12	14	13	48.0	960.0	120,0	0,0008	KNOWN	18,161	11,717
17	13	16	48.0	5120.0	120,0	0,0040	KNOWN	33,906	21,875
18	14	15	24.0	3680.0	65,0	0,2630	KNOWN	6,481	4,181
19	17	15	16.0	3840.0	63,0	2,0943	KNOWN	1,390	0,897
73	15	20	24.0	1040.0	66,0	0,0722	KNOWN	5,918	3,818
75	16	17	30.0	950.0	80,0	0,0156	KNOWN	12,247	7,901
26	16	32	48.0	1950.0	120,0	0,0015	KNOWN	18,897	12,192
74	17	19	30.0	1200.0	80,0	0,0197	KNOWN	9,307	6,004
45	18	41	48.0	4550.0	120,0	0,0036	KNOWN	18,758	12,102
49	18	42	16.0	5600.0	70,0	2,5133	KNOWN	1,023	0,660
48	49	18	48.0	640.0	85,0	0,0010	KNOWN	13,421	8,659
20	19	20	16.0	3200.0	60,0	1,9101	KNOWN	1,602	1,034
24	19	23	30.0	5600.0	50,0	0,2193	KNOWN	7,203	4,647
25	31	19	16.0	2000.0	60,0	1,1938	KNOWN	0,331	0,214
21	20	21	24.0	6720.0	66,0	0,4668	KNOWN	4,485	2,894
23	23	21	20.0	5120.0	60,0	1,0309	KNOWN	1,964	1,267
22	21	53	20.0	8470.0	70,0	1,2823	KNOWN	3,115	2,010
30	22	25	20.0	1040.0	135,0	0,0467	KNOWN	9,874	6,370
29	32	22	48.0	1920.0	120,0	0,0015	KNOWN	14,052	9,066
44	49	22	48.0	3840.0	120,0	0,0030	KNOWN	0,051	0,033
33	23	46	30.0	4800.0	135,0	0,0299	KNOWN	0,777	0,501
34	23	54	20.0	1760.0	55,0	0,4163	KNOWN	2,201	1,420
43	25	24	16.0	2560.0	64,0	1,3561	KNOWN	1,342	0,866
65	24	29	16.0	3360.0	50,0	2,8102	KNOWN	0,458	0,295
64	24	33	36.0	2400.0	80,0	0,0162	KNOWN	5,196	3,352
52	40	24	30.0	4960.0	80,0	0,0814	KNOWN	4,823	3,112
76	25	30	20.0	800.0	135,0	0,0359	KNOWN	7,854	5,067
42	27	26	16.0	3200.0	135,0	0,4261	KNOWN	0,483	0,312
31	30	26	20.0	1600.0	135,0	0,0719	KNOWN	7,995	5,158
32	26	46	20.0	1760.0	135,0	0,0791	KNOWN	6,515	4,203
78	28	27	16.0	450.0	135,0	0,0599	KNOWN	4,640	2,994
77	27	43	16.0	1600.0	135,0	0,2131	KNOWN	3,828	2,470
66	29	28	30.0	2000.0	70,0	0,0420	KNOWN	5,138	3,315
67	28	43	30.0	1920.0	0,0	99,9999	KNOWN	0,002	0,001
63	33	29	30.0	800.0	65,0	0,0193	KNOWN	4,539	2,929
71	35	29	16.0	3200.0	80,0	1,1218	KNOWN	0,163	0,105
82	31	30	16.0	3900.0	70,0	1,7503	KNOWN	1,276	0,823
27	32	31	20.0	1600.0	50,0	0,4514	KNOWN	2,427	1,566
62	34	33	24.0	1920.0	65,0	0,1372	KNOWN	1,420	0,916
60	34	35	16.0	2800.0	80,0	0,9816	KNOWN	0,725	0,468
61	37	34	24.0	880.0	75,0	0,0483	KNOWN	3,463	2,234
59	36	35	16.0	2080.0	80,0	0,7292	KNOWN	0,755	0,487
58	37	36	16.0	2230.0	80,0	0,7818	KNOWN	0,858	0,554
57	39	36	16.0	2400.0	80,0	0,8414	KNOWN	1,215	0,784
56	38	37	30.0	1280.0	80,0	0,0210	KNOWN	6,212	4,008
55	38	39	30.0	560.0	80,0	0,0092	KNOWN	0,350	0,226
53	40	38	30.0	640.0	80,0	0,0105	KNOWN	7,879	5,083
54	42	39	16.0	960.0	70,0	0,4309	KNOWN	2,182	1,408
51	41	40	30.0	1280.0	80,0	0,0210	KNOWN	14,966	9,655
50	41	42	16.0	960.0	80,0	0,3365	KNOWN	2,477	1,598
68	43	55	30.0	1280.0	70,0	0,0269	KNOWN	3,319	2,141
41	45	44	30.0	2720.0	135,0	0,0170	KNOWN	1,959	1,264
69	55	44	30.0	1600.0	135,0	0,0100	KNOWN	0,980	0,632
40	46	45	30.0	1280.0	135,0	0,0080	KNOWN	4,026	2,598
39	45	47	16.0	2400.0	55,0	1,6828	KNOWN	1,099	0,709
38	46	51	20.0	1840.0	63,0	0,3385	KNOWN	2,450	1,581
72	47	48	20.0	5290.0	55,0	1,2512	KNOWN	1,382	0,892
37	51	47	20.0	800.0	55,0	0,1092	KNOWN	1,352	0,872
35	54	48	16.0	9100.0	55,0	6,3805	KNOWN	0,617	0,398
36	51	50	20.0	880.0	110,0	0,0577	KNOWN	1,098	0,708
79	54	50	20.0	1120.0	55,0	0,2649	KNOWN	0,498	0,321
70	55	52	16.0	3700.0	55,0	2,5943	KNOWN	1,597	1,030

TABLE - SLS38
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 24 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,6		120,6
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,7		120,7
4	9	0	0	0	20,0	21,793	14,060	KNOWN	140,0		120,0
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,6		99,6
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,1		126,1
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,3		126,3
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,8		125,8
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,4		119,4
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,7		118,7
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,9		103,9
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	130,3		95,3
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	136,1		121,1
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	135,5		120,5
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,0		115,0
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	135,3		120,3
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	128,1		98,1
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	117,9		77,9
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,2		125,2
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	119,3		109,3
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	126,7		111,7
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	130,6		120,6
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	123,0		108,0
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	122,5		112,5
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	122,6		112,6
29	65	66	63	71	15,0	0,000	0,000	KNOWN	125,2		110,2
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	128,3		118,3
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	134,2		124,2
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,6		125,6
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	126,0		106,0
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	126,9		106,9
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	126,0		116,0
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	127,0		117,0
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	127,8		112,8
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	128,7		113,7
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	128,7		113,7
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	129,4		109,4
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	133,9		98,9
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	131,5		116,5
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	122,0		112,0
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	120,1		105,1
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	119,9		104,9
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	119,9		99,9
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	117,6		57,6
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	115,3		90,3
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,2		115,2
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	117,8		47,8
51	38	37	36	0	60,0	0,000	0,000	KNOWN	117,9		57,9
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	114,3		104,3
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	107,4		87,4
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	117,8		97,8
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	120,4		110,4

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48.0	800.0	86,0	0,0012	KNOWN	2,653	1,711
6	2	6	48.0	4960.0	86,0	0,0072	KNOWN	20,168	13,012
7	2	12	48.0	1920.0	70,0	0,0041	KNOWN	21,870	14,110
8	3	5	30.0	1600.0	65,0	0,0386	KNOWN	6,105	3,939
9	4	5	48.0	2000.0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,512	0,330
10	5	14	48.0	2080.0	120,0	0,0016	KNOWN	25,665	16,558
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40.0	4160.0	67,0	0,0234	KNOWN	12,949	8,354
4	6	10	48.0	1920.0	86,0	0,0028	KNOWN	27,415	17,687
16	9	8	16.0	592.0	40,0	0,7482	KNOWN	0,515	0,333
47	8	18	40.0	3200.0	67,0	0,0180	KNOWN	9,156	5,907
5	10	9	48.0	2240.0	86,0	0,0033	KNOWN	24,013	15,492
15	9	11	16.0	4000.0	40,0	5,0552	KNOWN	0,281	0,181
46	9	49	48.0	3350.0	85,0	0,0050	KNOWN	18,675	12,048
14	10	11	24.0	2720.0	35,0	0,6109	KNOWN	1,713	1,105
13	12	11	16.0	5120.0	40,0	6,4706	KNOWN	0,727	0,469
28	16	11	24.0	1650.0	30,0	0,4929	KNOWN	0,704	0,454
11	12	13	48.0	1440.0	70,0	0,0031	KNOWN	18,431	11,891
12	14	13	48.0	960.0	120,0	0,0008	KNOWN	17,883	11,538
17	13	16	48.0	5120.0	120,0	0,0040	KNOWN	33,275	21,468
18	14	15	24.0	3680.0	65,0	0,2630	KNOWN	6,589	4,251
19	17	15	16.0	3840.0	63,0	2,0943	KNOWN	1,643	1,060
73	15	20	24.0	1040.0	66,0	0,0722	KNOWN	6,278	4,051
75	16	17	30.0	950.0	80,0	0,0156	KNOWN	7,014	4,525
26	16	32	48.0	1950.0	120,0	0,0015	KNOWN	23,339	15,058
74	17	19	30.0	1200.0	80,0	0,0197	KNOWN	3,823	2,466
45	18	41	48.0	4550.0	120,0	0,0036	KNOWN	22,307	14,392
49	18	42	16.0	5600.0	70,0	2,5133	KNOWN	1,192	0,769
48	49	18	48.0	640.0	85,0	0,0010	KNOWN	16,838	10,863
20	19	20	16.0	3200.0	60,0	1,9101	KNOWN	2,045	1,319
24	19	23	30.0	5600.0	0,0	99,9999	KNOWN	0,002	0,001
25	19	31	16.0	2000.0	60,0	1,1938	KNOWN	0,939	0,606
21	20	21	24.0	6720.0	66,0	0,4668	KNOWN	5,284	3,409
23	23	21	20.0	5120.0	60,0	1,0309	KNOWN	1,163	0,751
22	21	53	20.0	8470.0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20.0	1040.0	135,0	0,0467	KNOWN	11,901	7,678
29	32	22	48.0	1920.0	120,0	0,0015	KNOWN	19,124	12,338
44	22	49	48.0	3840.0	120,0	0,0030	KNOWN	2,932	1,892
33	46	23	30.0	4800.0	135,0	0,0299	KNOWN	5,194	3,351
34	23	54	20.0	1760.0	55,0	0,4163	KNOWN	1,956	1,262
43	25	24	16.0	2560.0	64,0	1,3561	KNOWN	1,781	1,149
65	24	29	16.0	3360.0	50,0	2,8102	KNOWN	0,709	0,456
64	24	33	36.0	2400.0	80,0	0,0162	KNOWN	7,206	4,649
52	40	24	30.0	4960.0	80,0	0,0814	KNOWN	6,646	4,287
76	25	30	20.0	800.0	135,0	0,0359	KNOWN	9,439	6,089
42	26	27	16.0	3200.0	135,0	0,4261	KNOWN	1,051	0,678
31	30	26	20.0	1600.0	135,0	0,0719	KNOWN	10,232	6,601
32	26	46	20.0	1760.0	135,0	0,0791	KNOWN	7,242	4,673
78	28	27	16.0	450.0	135,0	0,0599	KNOWN	0,787	0,508
77	27	43	16.0	1600.0	135,0	0,2131	KNOWN	1,606	1,036
66	29	28	30.0	2000.0	70,0	0,0420	KNOWN	9,312	6,008
67	28	43	30.0	1920.0	135,0	0,0120	KNOWN	7,904	5,100
63	33	29	30.0	800.0	65,0	0,0193	KNOWN	7,774	5,016
71	35	29	16.0	3200.0	80,0	1,1218	KNOWN	0,829	0,535
82	31	30	16.0	3900.0	70,0	1,7503	KNOWN	1,925	1,242
27	32	31	20.0	1600.0	50,0	0,4514	KNOWN	1,807	1,166
62	34	33	24.0	1920.0	65,0	0,1372	KNOWN	2,646	1,707
60	34	35	16.0	2800.0	80,0	0,9816	KNOWN	0,954	0,615
61	37	34	24.0	880.0	75,0	0,0483	KNOWN	4,917	3,172
59	36	35	16.0	2080.0	80,0	0,7292	KNOWN	1,192	0,769
58	37	36	16.0	2230.0	80,0	0,7818	KNOWN	1,020	0,658
57	39	36	16.0	2400.0	80,0	0,8414	KNOWN	1,490	0,961
56	38	37	30.0	1280.0	80,0	0,0210	KNOWN	7,828	5,050
55	38	39	30.0	560.0	80,0	0,0092	KNOWN	0,176	0,113
53	40	38	30.0	640.0	80,0	0,0105	KNOWN	9,217	5,946
54	42	39	16.0	960.0	70,0	0,4309	KNOWN	2,736	1,765
51	41	40	30.0	1280.0	80,0	0,0210	KNOWN	18,125	11,694
50	41	42	16.0	960.0	80,0	0,3365	KNOWN	2,861	1,846
68	43	55	30.0	1280.0	70,0	0,0269	KNOWN	9,000	5,807
41	44	45	30.0	2720.0	135,0	0,0170	KNOWN	3,684	2,377
69	55	44	30.0	1600.0	135,0	0,0100	KNOWN	6,691	4,317
40	45	46	30.0	1280.0	135,0	0,0080	KNOWN	1,270	0,819
39	45	47	16.0	2400.0	55,0	1,6828	KNOWN	1,186	0,765
38	46	51	20.0	1840.0	63,0	0,3385	KNOWN	2,609	1,683
72	47	48	20.0	5290.0	55,0	1,2512	KNOWN	1,393	0,898
37	51	47	20.0	800.0	55,0	0,1092	KNOWN	1,276	0,823
35	54	48	16.0	9100.0	55,0	6,3805	KNOWN	0,607	0,392
36	51	50	20.0	880.0	110,0	0,0577	KNOWN	1,333	0,860
79	54	50	20.0	1120.0	55,0	0,2649	KNOWN	0,264	0,170
70	55	52	16.0	3700.0	55,0	2,5943	KNOWN	1,597	1,030

TABLE - SLS39
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 66 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,5		120,5
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,5		120,5
4	9	0	0	0	20,0	21,793	14,060	KNOWN	139,8		119,8
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,3		99,3
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,3		126,3
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,6		125,6
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,2		119,2
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,5		118,5
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,6		103,6
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	129,8		94,8
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,7		120,7
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	132,9		117,9
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,3		115,3
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	130,5		115,5
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	127,9		97,9
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	121,6		81,6
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	126,7		116,7
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	132,2		117,2
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,4		122,4
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	127,1		112,1
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	125,5		115,5
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	125,4		115,4
29	65	66	63	71	15,0	0,000	0,000	KNOWN	132,1		117,1
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	130,6		120,6
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	132,1		122,1
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,4		125,4
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	132,1		112,1
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	132,1		112,1
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	131,8		121,8
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	131,9		121,9
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	132,2		117,2
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	132,5		117,5
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	132,5		117,5
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	132,8		112,8
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,8		99,8
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	133,5		118,5
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	125,4		115,4
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	125,4		110,4
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	125,7		110,7
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	126,0		106,0
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	124,0		64,0
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	121,8		96,8
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,4		115,4
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	124,3		54,3
51	38	37	36	0	60,0	0,000	0,000	KNOWN	124,4		64,4
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	119,2		109,2
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	111,1		91,1
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	124,5		104,5
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	125,4		115,4

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48,0	2880,0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48,0	800,0	86,0	0,0012	KNOWN	2,374	1,532
6	2	6	48,0	4960,0	86,0	0,0072	KNOWN	19,207	12,392
7	2	12	48,0	1920,0	70,0	0,0041	KNOWN	22,552	14,550
8	3	5	30,0	1600,0	65,0	0,0386	KNOWN	6,384	4,118
9	4	5	48,0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16,0	1280,0	75,0	0,5056	KNOWN	0,466	0,301
10	5	14	48,0	2080,0	120,0	0,0016	KNOWN	25,990	16,768
1	7	6	16,0	11700,0	50,0	9,7854	KNOWN	0,697	0,450
3	6	8	40,0	4160,0	67,0	0,0234	KNOWN	12,490	8,058
4	6	10	48,0	1920,0	86,0	0,0028	KNOWN	26,913	17,363
16	9	8	16,0	592,0	40,0	0,7482	KNOWN	0,418	0,270
47	8	18	40,0	3200,0	67,0	0,0180	KNOWN	8,599	5,548
5	10	9	48,0	2240,0	86,0	0,0033	KNOWN	23,346	15,062
15	9	11	16,0	4000,0	40,0	5,0552	KNOWN	0,381	0,246
46	9	49	48,0	3350,0	85,0	0,0050	KNOWN	18,005	11,616
14	10	11	24,0	2720,0	35,0	0,6109	KNOWN	1,878	1,211
13	12	11	16,0	5120,0	40,0	6,4706	KNOWN	0,730	0,471
28	16	11	24,0	1650,0	30,0	0,4929	KNOWN	0,437	0,282
11	12	13	48,0	1440,0	70,0	0,0031	KNOWN	19,064	12,300
12	14	13	48,0	960,0	120,0	0,0008	KNOWN	18,152	11,711
17	13	16	48,0	5120,0	120,0	0,0040	KNOWN	34,179	22,051
18	14	15	24,0	3680,0	65,0	0,2630	KNOWN	6,644	4,287
19	17	15	16,0	3840,0	63,0	2,0943	KNOWN	1,236	0,797
73	15	20	24,0	1040,0	66,0	0,0722	KNOWN	5,927	3,824
75	16	17	30,0	950,0	80,0	0,0156	KNOWN	16,243	10,479
26	16	32	48,0	1950,0	120,0	0,0015	KNOWN	15,283	9,860
74	17	19	30,0	1200,0	80,0	0,0197	KNOWN	13,457	8,682
45	18	41	48,0	4550,0	120,0	0,0036	KNOWN	14,811	9,556
49	18	42	16,0	5600,0	70,0	2,5133	KNOWN	0,831	0,536
48	49	18	48,0	640,0	85,0	0,0010	KNOWN	9,539	6,154
20	19	20	16,0	3200,0	60,0	1,9101	KNOWN	1,186	0,765
24	19	23	30,0	5600,0	135,0	0,0349	KNOWN	12,606	8,133
25	31	19	16,0	2000,0	60,0	1,1938	KNOWN	1,172	0,756
21	20	21	24,0	6720,0	66,0	0,4668	KNOWN	4,075	2,629
23	23	21	20,0	5120,0	60,0	1,0309	KNOWN	2,373	1,531
22	21	53	20,0	8470,0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20,0	1040,0	135,0	0,0467	KNOWN	9,348	6,031
29	32	22	48,0	1920,0	120,0	0,0015	KNOWN	9,933	6,408
44	49	22	48,0	3840,0	120,0	0,0030	KNOWN	3,646	2,352
33	23	46	30,0	4800,0	135,0	0,0299	KNOWN	5,694	3,674
34	23	54	20,0	1760,0	55,0	0,4163	KNOWN	2,462	1,588
43	25	24	16,0	2560,0	64,0	1,3561	KNOWN	0,324	0,209
65	24	29	16,0	3360,0	50,0	2,8102	KNOWN	0,170	0,110
64	24	33	36,0	2400,0	80,0	0,0162	KNOWN	2,643	1,705
52	40	24	30,0	4960,0	80,0	0,0814	KNOWN	3,002	1,937
76	25	30	20,0	800,0	135,0	0,0359	KNOWN	8,341	5,381
42	26	27	16,0	3200,0	135,0	0,4261	KNOWN	2,041	1,317
31	30	26	20,0	1600,0	135,0	0,0719	KNOWN	8,148	5,257
32	26	46	20,0	1760,0	135,0	0,0791	KNOWN	4,169	2,690
78	27	28	16,0	450,0	135,0	0,0599	KNOWN	1,117	0,721
77	27	43	16,0	1600,0	135,0	0,2131	KNOWN	0,583	0,376
66	29	28	30,0	2000,0	0,0	99,9999	KNOWN	0,002	0,001
67	28	43	30,0	1920,0	135,0	0,0120	KNOWN	0,608	0,392
63	33	29	30,0	800,0	65,0	0,0193	KNOWN	0,617	0,398
71	29	35	16,0	3200,0	80,0	1,1218	KNOWN	0,510	0,329
82	31	30	16,0	3900,0	70,0	1,7503	KNOWN	0,938	0,605
27	32	31	20,0	1600,0	50,0	0,4514	KNOWN	2,932	1,891
62	33	34	24,0	1920,0	65,0	0,1372	KNOWN	0,223	0,144
60	34	35	16,0	2800,0	80,0	0,9816	KNOWN	0,548	0,353
61	37	34	24,0	880,0	75,0	0,0483	KNOWN	1,643	1,060
59	36	35	16,0	2080,0	80,0	0,7292	KNOWN	0,255	0,164
58	37	36	16,0	2230,0	80,0	0,7818	KNOWN	0,682	0,440
57	39	36	16,0	2400,0	80,0	0,8414	KNOWN	0,893	0,576
56	38	37	30,0	1280,0	80,0	0,0210	KNOWN	4,215	2,720
55	38	39	30,0	560,0	80,0	0,0092	KNOWN	0,657	0,424
53	40	38	30,0	640,0	80,0	0,0105	KNOWN	6,190	3,994
54	42	39	16,0	960,0	70,0	0,4309	KNOWN	1,553	1,002
51	41	40	30,0	1280,0	80,0	0,0210	KNOWN	11,455	7,390
50	41	42	16,0	960,0	80,0	0,3365	KNOWN	2,039	1,316
68	43	55	30,0	1280,0	70,0	0,0269	KNOWN	0,674	0,435
41	45	44	30,0	2720,0	135,0	0,0170	KNOWN	4,635	2,990
69	44	55	30,0	1600,0	135,0	0,0100	KNOWN	1,630	1,052
40	46	45	30,0	1280,0	135,0	0,0080	KNOWN	6,568	4,237
39	45	47	16,0	2400,0	55,0	1,6828	KNOWN	0,999	0,645
38	46	51	20,0	1840,0	63,0	0,3385	KNOWN	2,289	1,477
72	47	48	20,0	5290,0	55,0	1,2512	KNOWN	1,369	0,883
37	51	47	20,0	800,0	55,0	0,1892	KNOWN	1,439	0,928
35	54	48	16,0	9100,0	55,0	6,3805	KNOWN	0,631	0,407
36	51	50	20,0	880,0	110,0	0,0577	KNOWN	0,850	0,549
79	54	50	20,0	1120,0	55,0	0,2649	KNOWN	0,746	0,481
70	55	52	16,0	3700,0	55,0	2,5943	KNOWN	1,597	1,030

TABLE - SLS40
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 23 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,5		120,5
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,5		120,5
4	9	0	0	0	20,0	21,793	14,060	KNOWN	139,7		119,7
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,3		99,3
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,6		125,6
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,2		119,2
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,4		118,4
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,6		103,6
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	127,5		92,5
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,8		120,8
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	133,7		118,7
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,3		115,3
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	132,1		117,1
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	124,6		94,6
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	109,8		69,8
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,4		125,4
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	130,2		120,2
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	130,6		115,6
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	133,1		123,1
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	130,3		115,3
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	129,9		119,9
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	130,0		120,0
29	65	66	63	71	15,0	0,000	0,000	KNOWN	130,1		115,1
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	132,1		122,1
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	133,1		123,1
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,5		125,5
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	130,3		110,3
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	130,5		110,5
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	130,1		120,1
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	130,3		120,3
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	130,8		115,8
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	131,4		116,4
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	131,4		116,4
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	131,8		111,8
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,5		99,5
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,9		117,9
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	129,8		119,8
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	129,6		114,6
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	129,6		114,6
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	129,7		109,7
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	127,7		67,7
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	125,5		100,5
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,4		115,4
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	128,0		58,0
51	38	37	36	0	60,0	0,000	0,000	KNOWN	128,1		68,1
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	123,4		113,4
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	99,3		79,3
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	128,1		108,1
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	129,6		119,6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48,0	2880,0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48,0	800,0	86,0	0,0012	KNOWN	2,340	1,510
6	2	6	48,0	4960,0	86,0	0,0072	KNOWN	19,162	12,363
7	2	12	48,0	1920,0	70,0	0,0041	KNOWN	22,563	14,557
8	3	5	30,0	1600,0	65,0	0,0386	KNOWN	6,417	4,140
9	4	5	48,0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16,0	1280,0	75,0	0,5056	KNOWN	0,443	0,286
10	5	14	48,0	2080,0	120,0	0,0016	KNOWN	26,047	16,804
1	7	6	16,0	11700,0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40,0	4160,0	67,0	0,0234	KNOWN	12,520	8,078
4	6	10	48,0	1920,0	86,0	0,0028	KNOWN	26,839	17,315
16	9	8	16,0	592,0	40,0	0,7482	KNOWN	0,449	0,290
47	8	18	40,0	3200,0	67,0	0,0180	KNOWN	8,660	5,587
5	10	9	48,0	2240,0	86,0	0,0033	KNOWN	23,312	15,040
15	9	11	16,0	4000,0	40,0	5,0552	KNOWN	0,363	0,234
46	9	49	48,0	3350,0	85,0	0,0050	KNOWN	17,959	11,587
14	10	11	24,0	2720,0	35,0	0,6109	KNOWN	1,837	1,185
13	12	11	16,0	5120,0	40,0	6,4706	KNOWN	0,720	0,464
28	16	11	24,0	1650,0	30,0	0,4929	KNOWN	0,506	0,327
11	12	13	48,0	1440,0	70,0	0,0031	KNOWN	19,063	12,298
12	14	13	48,0	960,0	120,0	0,0008	KNOWN	17,308	11,166
17	13	16	48,0	5120,0	120,0	0,0040	KNOWN	33,332	21,504
18	14	15	24,0	3680,0	65,0	0,2630	KNOWN	7,545	4,868
19	17	15	16,0	3840,0	63,0	2,0943	KNOWN	1,796	1,159
73	15	20	24,0	1040,0	66,0	0,0722	KNOWN	7,388	4,767
75	16	17	30,0	950,0	80,0	0,0156	KNOWN	14,099	9,096
26	16	32	48,0	1950,0	120,0	0,0015	KNOWN	16,512	10,653
74	17	19	30,0	1200,0	80,0	0,0197	KNOWN	10,754	6,938
45	18	41	48,0	4550,0	120,0	0,0036	KNOWN	17,576	11,339
49	18	42	16,0	5600,0	70,0	2,5133	KNOWN	0,966	0,623
48	49	18	48,0	640,0	85,0	0,0010	KNOWN	12,371	7,981
20	19	20	16,0	3200,0	60,0	1,9101	KNOWN	2,097	1,353
24	19	23	30,0	5600,0	135,0	0,0349	KNOWN	8,729	5,632
25	31	19	16,0	2000,0	60,0	1,1938	KNOWN	0,910	0,587
21	20	21	24,0	6720,0	66,0	0,4668	KNOWN	6,447	4,159
23	23	21	20,0	5120,0	0,0	99,9999	KNOWN	0,001	0,001
22	21	53	20,0	8470,0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20,0	1040,0	135,0	0,0467	KNOWN	8,150	5,258
29	32	22	48,0	1920,0	120,0	0,0015	KNOWN	11,613	7,492
44	49	22	48,0	3840,0	120,0	0,0030	KNOWN	0,771	0,497
33	23	46	30,0	4800,0	135,0	0,0299	KNOWN	4,305	2,777
34	23	54	20,0	1760,0	55,0	0,4163	KNOWN	2,347	1,514
43	25	24	16,0	2560,0	64,0	1,3561	KNOWN	1,385	0,894
65	24	29	16,0	3360,0	50,0	2,8102	KNOWN	0,395	0,255
64	24	33	36,0	2400,0	80,0	0,0162	KNOWN	4,716	3,042
52	40	24	30,0	4960,0	80,0	0,0814	KNOWN	4,237	2,734
76	25	30	20,0	800,0	135,0	0,0359	KNOWN	6,082	3,924
42	26	27	16,0	3200,0	135,0	0,4261	KNOWN	0,868	0,560
31	30	26	20,0	1600,0	135,0	0,0719	KNOWN	5,695	3,674
32	26	46	20,0	1760,0	135,0	0,0791	KNOWN	2,888	1,863
78	28	27	16,0	450,0	135,0	0,0599	KNOWN	0,225	0,145
77	27	43	16,0	1600,0	135,0	0,2131	KNOWN	0,681	0,439
66	29	28	30,0	2000,0	135,0	0,0125	KNOWN	3,960	2,555
67	28	43	30,0	1920,0	135,0	0,0120	KNOWN	3,284	2,119
63	33	29	30,0	800,0	65,0	0,0193	KNOWN	3,700	2,387
71	29	35	16,0	3200,0	80,0	1,1218	KNOWN	0,130	0,084
82	31	30	16,0	3900,0	70,0	1,7503	KNOWN	0,745	0,480
27	32	31	20,0	1600,0	50,0	0,4514	KNOWN	2,476	1,597
62	34	33	24,0	1920,0	65,0	0,1372	KNOWN	1,056	0,681
60	34	35	16,0	2800,0	80,0	0,9816	KNOWN	0,611	0,394
61	37	34	24,0	880,0	75,0	0,0483	KNOWN	2,985	1,926
59	36	35	16,0	2080,0	80,0	0,7292	KNOWN	0,575	0,371
58	37	36	16,0	2230,0	80,0	0,7818	KNOWN	0,784	0,506
57	39	36	16,0	2400,0	80,0	0,8414	KNOWN	1,108	0,715
56	38	37	30,0	1280,0	80,0	0,0210	KNOWN	5,661	3,652
55	38	39	30,0	560,0	80,0	0,0092	KNOWN	0,430	0,278
53	40	38	30,0	640,0	80,0	0,0105	KNOWN	7,408	4,780
54	42	39	16,0	960,0	70,0	0,4309	KNOWN	1,995	1,287
51	41	40	30,0	1280,0	80,0	0,0210	KNOWN	13,908	8,973
50	41	42	16,0	960,0	80,0	0,3365	KNOWN	2,347	1,514
68	43	55	30,0	1280,0	70,0	0,0269	KNOWN	3,462	2,234
41	45	44	30,0	2720,0	135,0	0,0170	KNOWN	1,852	1,195
69	55	44	30,0	1600,0	135,0	0,0100	KNOWN	1,142	0,737
40	46	45	30,0	1280,0	135,0	0,0080	KNOWN	3,847	2,482
39	45	47	16,0	2400,0	55,0	1,6828	KNOWN	1,063	0,686
38	46	51	20,0	1840,0	63,0	0,3385	KNOWN	2,341	1,510
72	47	48	20,0	5290,0	55,0	1,2512	KNOWN	1,375	0,887
37	51	47	20,0	800,0	55,0	0,1892	KNOWN	1,382	0,892
35	54	48	16,0	9100,0	55,0	6,3805	KNOWN	0,624	0,403
36	51	50	20,0	880,0	110,0	0,0577	KNOWN	0,959	0,619
79	54	50	20,0	1120,0	55,0	0,2649	KNOWN	0,638	0,411
70	55	52	16,0	3700,0	55,0	2,5943	KNOWN	1,597	1,030

TABLE – SLS41
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 35 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	– CONSUMPTION – CFS	MGD	STATUS CONS	TOT HEAD – FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,6		120,6
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,6		120,6
4	9	0	0	0	20,0	21,793	14,060	KNOWN	139,9		119,9
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,4		99,4
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,6		125,6
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,6		118,6
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,7		103,7
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	131,5		96,5
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,8		120,8
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	133,6		118,6
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,2		115,2
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	131,8		116,8
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	130,1		100,1
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	126,7		86,7
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	128,9		118,9
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	130,0		115,0
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,7		122,7
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	129,4		114,4
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	129,1		119,1
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	129,2		119,2
29	65	66	63	71	15,0	0,000	0,000	KNOWN	129,4		114,4
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	131,6		121,6
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	132,8		122,8
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,4		125,4
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	129,7		109,7
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,9		109,9
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	129,4		119,4
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	129,8		119,8
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	130,3		115,3
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,9		115,9
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,9		115,9
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	131,4		111,4
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,4		99,4
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,6		117,6
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	129,0		119,0
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	128,6		113,6
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	128,6		113,6
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	128,6		108,6
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	126,3		66,3
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	121,8		96,8
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,3		115,3
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	126,9		56,9
51	38	37	36	0	60,0	0,000	0,000	KNOWN	126,9		66,9
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	122,4		112,4
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	116,2		96,2
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	127,2		107,2
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	128,6		118,6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE – R*F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48,0	2880.0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48,0	800.0	86,0	0,0012	KNOWN	2,512	1,620
6	2	6	48,0	4960.0	86,0	0,0072	KNOWN	19,629	12,664
7	2	12	48,0	1920.0	70,0	0,0041	KNOWN	22,268	14,366
8	3	5	30.0	1600.0	65,0	0,0386	KNOWN	6,246	4,030
9	4	5	48.0	2000.0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,501	0,323
10	5	14	48.0	2080.0	120,0	0,0016	KNOWN	25,818	16,657
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40.0	4160.0	67,0	0,0234	KNOWN	12,681	8,181
4	6	10	48.0	1920.0	86,0	0,0028	KNOWN	27,146	17,514
16	9	8	16.0	592.0	40,0	0,7482	KNOWN	0,458	0,296
47	8	18	40,0	3200.0	67,0	0,0180	KNOWN	8,830	5,697
5	10	9	48.0	2240.0	86,0	0,0033	KNOWN	23,615	15,236
15	9	11	16.0	4000.0	40,0	5,0552	KNOWN	0,356	0,230
46	9	49	48.0	3350,0	85,0	0,0050	KNOWN	18,261	11,781
14	10	11	24,0	2720.0	35,0	0,6109	KNOWN	1,838	1,186
13	12	11	16.0	5120.0	40,0	6,4706	KNOWN	0,735	0,474
28	16	11	24,0	1650.0	30,0	0,4929	KNOWN	0,496	0,320
11	12	13	48,0	1440.0	70,0	0,0031	KNOWN	18,810	12,135
12	14	13	48,0	960.0	120,0	0,0008	KNOWN	18,637	12,024
17	13	16	48,0	5120,0	120,0	0,0040	KNOWN	34,412	22,201
18	14	15	24,0	3680.0	65,0	0,2630	KNOWN	5,987	3,862
19	17	15	16,0	3840.0	63,0	2,0943	KNOWN	1,005	0,648
73	15	20	24,0	1040.0	66,0	0,0722	KNOWN	5,038	3,251
75	16	17	30,0	950.0	80,0	0,0156	KNOWN	14,214	9,170
26	16	32	48,0	1950.0	120,0	0,0015	KNOWN	17,467	11,269
74	17	19	30.0	1200.0	80,0	0,0197	KNOWN	11,660	7,523
45	18	41	48,0	4550.0	120,0	0,0036	KNOWN	18,344	11,835
49	18	42	16,0	5600.0	70,0	2,5133	KNOWN	1,003	0,647
48	49	18	48,0	640.0	85,0	0.0010	KNOWN	13,012	8,395
20	19	20	16.0	3200.0	60,0	1,9101	KNOWN	0,937	0,605
24	19	23	30,0	5600.0	135,0	0.0349	KNOWN	10,821	6,981
25	31	19	16.0	2000.0	60,0	1,1938	KNOWN	0,935	0,603
21	20	21	24,0	6720.0	66,0	0.4668	KNOWN	2,906	1,875
23	23	21	20,0	5120.0	135,0	0,2300	KNOWN	3,374	2,177
22	21	53	20.0	8470.0	70,0	1.2823	KNOWN	3,116	2,010
30	22	25	20.0	1040.0	135,0	0,0467	KNOWN	8,672	5,595
29	32	22	48.0	1920.0	120,0	0,0015	KNOWN	12,475	8,048
44	49	22	48,0	3840,0	120,0	0,0030	KNOWN	0,428	0,276
33	23	46	30,0	4800,0	135,0	0,0299	KNOWN	3,089	1,993
34	23	54	20,0	1760,0	55,0	0,4163	KNOWN	2,145	1,384
43	25	24	16,0	2560,0	64,0	1,3561	KNOWN	1,458	0,940
65	24	29	16,0	3360,0	50,0	2,8102	KNOWN	0,443	0,286
64	24	33	36,0	2400,0	80,0	0,0162	KNOWN	5,106	3,294
52	40	24	30,0	4960,0	80,0	0,0814	KNOWN	4,602	2,969
76	25	30	20.0	800.0	135,0	0,0359	KNOWN	6,532	4,214
42	26	27	16,0	3200.0	135,0	0,4261	KNOWN	0,820	0,529
31	30	26	20,0	1600,0	135,0	0,0719	KNOWN	6,233	4,021
32	26	46	20,0	1760.0	135,0	0,0791	KNOWN	3,475	2,242
78	28	27	16,0	450,0	135,0	0,0599	KNOWN	0,339	0,219
77	27	43	16,0	1600,0	135,0	0,2131	KNOWN	0,819	0,528
66	29	28	30,0	2000,0	135,0	0,0125	KNOWN	4,839	3,122
67	28	43	30,0	1920,0	135,0	0,0120	KNOWN	3,988	2,573
63	33	29	30,0	800,0	65,0	0,0193	KNOWN	4,314	2,783
71	35	29	16,0	3200,0	80,0	1,1218	KNOWN	0,050	0,032
82	31	30	16,0	3900,0	70,0	1,7503	KNOWN	0,832	0,537
27	32	31	20,0	1600.0	50,0	0,4514	KNOWN	2,589	1,670
62	34	33	24,0	1920,0	65,0	0,1372	KNOWN	1,285	0,829
60	34	35	16,0	2800,0	80,0	0,9816	KNOWN	0,697	0,450
61	37	34	24,0	880,0	75,0	0,0483	KNOWN	3,300	2,129
59	36	35	16,0	2080,0	80,0	0,7292	KNOWN	0,703	0,453
58	37	36	16,0	2230,0	80,0	0,7818	KNOWN	0,838	0,541
57	39	36	16,0	2400,0	80,0	0,8414	KNOWN	1,182	0,763
56	38	37	30,0	1280,0	80,0	0,0210	KNOWN	6,029	3,890
55	38	39	30,0	560,0	80,0	0,0092	KNOWN	0,382	0,247
53	40	38	30,0	640,0	80,0	0,0105	KNOWN	7,729	4,986
54	42	39	16,0	960,0	70,0	0,4309	KNOWN	2,117	1,366
51	41	40	30,0	1280,0	80,0	0,0210	KNOWN	14,594	9,416
50	41	42	16,0	960,0	80,0	0,3365	KNOWN	2,432	1,569
68	43	55	30,0	1280,0	70,0	0,0269	KNOWN	4,295	2,771
41	45	44	30,0	2720,0	135,0	0,0170	KNOWN	1,021	0,659
69	55	44	30,0	1600,0	135,0	0,0100	KNOWN	1,986	1,281
40	46	45	30,0	1280,0	135,0	0,0080	KNOWN	3,133	2,021
39	45	47	16,0	2400,0	55,0	1,6828	KNOWN	1,182	0,762
38	46	51	20,0	1840,0	63,0	0,3385	KNOWN	2,424	1,564
72	47	48	20,0	5290,0	55,0	1,2512	KNOWN	2,000	1,290
37	51	47	20,0	800,0	55,0	0,1892	KNOWN	1,887	1,218
35	54	48	16,0	9100,0	0,0	99,9999	KNOWN	0,000	0,000
36	51	50	20,0	880,0	110,0	0,0577	KNOWN	0,537	0,346
79	54	50	20,0	1120,0	55,0	0,2649	KNOWN	1,059	0,684
70	55	52	16,0	3700,0	55,0	2,5943	KNOWN	1,596	1,030

TABLE – SLS42
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 72 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	– CONSUMPTION – CFS	MGD	STATUS CONS	TOT HEAD – FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,6		120,6
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,6		120,6
4	9	0	0	0	20,0	21,793	14,060	KNOWN	139,9		119,9
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,4		99,4
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,6		125,6
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,6		118,6
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,7		103,7
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	131,5		96,5
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,7		120,7
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	133,6		118,6
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,2		115,2
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	131,8		116,8
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	130,0		100,0
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	126,5		86,5
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	128,9		118,9
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	130,0		115,0
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,7		122,7
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	129,5		114,5
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	129,2		119,2
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	129,2		119,2
29	65	66	63	71	15,0	0,000	0,000	KNOWN	129,4		114,4
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	131,6		121,6
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	132,8		122,8
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,4		125,4
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	129,7		109,7
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,9		109,9
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	129,4		119,4
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	129,8		119,8
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	130,3		115,3
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,9		115,9
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,9		115,9
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	131,4		111,4
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,4		99,4
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,7		117,7
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	129,0		119,0
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	128,6		113,6
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	128,6		113,6
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	128,7		108,7
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	127,0		67,0
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	122,3		97,3
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,3		115,3
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	126,8		56,8
51	38	37	36	0	60,0	0,000	0,000	KNOWN	127,0		67,0
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	122,5		112,5
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	116,0		96,0
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	126,7		106,7
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	128,6		118,6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE – R*F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67,0	0,0067	KNOWN	28,241	18.220
81	3	2	48.0	800,0	86,0	0,0012	KNOWN	2,510	1,619
6	2	6	48.0	4960.0	86,0	0,0072	KNOWN	19,624	12,661
7	2	12	48.0	1920,0	70,0	0,0041	KNOWN	22,271	14,369
8	3	5	30,0	1600.0	65,0	0,0386	KNOWN	6,248	4.031
9	4	5	48,0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16,0	1280,0	75,0	0,5056	KNOWN	0,500	0,323
10	5	14	48,0	2080,0	120,0	0,0016	KNOWN	25,820	16,658
1	7	6	16,0	11700,0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40,0	4160,0	67,0	0,0234	KNOWN	12,679	8,180
4	6	10	48,0	1920,0	86,0	0,0028	KNOWN	27,142	17,511
16	9	8	16,0	592,0	40,0	0,7482	KNOWN	0,458	0,296
47	8	18	40,0	3200,0	67,0	0,0180	KNOWN	8,828	5,695
5	10	9	48,0	2240,0	86,0	0,0033	KNOWN	23,614	15,235
15	9	11	16,0	4000,0	40,0	5,0552	KNOWN	0,357	0,230
46	9	49	48,0	3350,0	85,0	0,0050	KNOWN	18,258	11,779
14	10	11	24,0	2720,0	35,0	0,6109	KNOWN	1,839	1,186
13	12	11	16,0	5120,0	40,0	6,4706	KNOWN	0,735	0,474
28	16	11	24,0	1650,0	30,0	0,4929	KNOWN	0,496	0,320
11	12	13	48,0	1440,0	70,0	0,0031	KNOWN	18,813	12,137
12	14	13	48,0	960,0	120,0	0,0008	KNOWN	18,629	12,018
17	13	16	48,0	5120,0	120,0	0,0040	KNOWN	34,403	22,196
18	14	15	24,0	3680,0	65,0	0,2630	KNOWN	5,998	3,870
19	17	15	16,0	3840,0	63,0	2,0943	KNOWN	1,010	0,651
73	15	20	24,0	1040,0	66,0	0,0722	KNOWN	5,055	3,261
75	16	17	30,0	950,0	80,0	0,0156	KNOWN	14,236	9,184
26	16	32	48,0	1950,0	120,0	0,0015	KNOWN	17,455	11,262
74	17	19	30,0	1200,0	80,0	0,0197	KNOWN	11,676	7,533
45	18	41	48,0	4550,0	120,0	0,0036	KNOWN	18,323	11,821
49	18	42	16,0	5600,0	70,0	2,5133	KNOWN	1,002	0,646
48	49	18	48,0	640,0	85,0	0,0010	KNOWN	12,992	8,382
20	19	20	16,0	3200,0	60,0	1,9101	KNOWN	0,944	0,609
24	19	23	30,0	5600,0	135,0	0,0349	KNOWN	10,834	6,990
25	31	19	16,0	2000,0	60,0	1,1938	KNOWN	0,940	0,606
21	20	21	24,0	6720,0	66,0	0,4668	KNOWN	2,961	1,910
23	23	21	20,0	5120,0	135,0	0,2300	KNOWN	3,487	2,250
22	21	53	20,0	8470,0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20,0	1040,0	135,0	0,0467	KNOWN	8,661	5,588
29	32	22	48,0	1920,0	120,0	0,0015	KNOWN	12,448	8,031
44	49	22	48,0	3840,0	120,0	0,0030	KNOWN	0,445	0,287
33	23	46	30,0	4800,0	135,0	0,0299	KNOWN	2,817	1,817
34	23	54	20,0	1760,0	55,0	0,4163	KNOWN	2,454	1,583
43	25	24	16,0	2560,0	64,0	1,3561	KNOWN	1,455	0,939
65	24	29	16,0	3360,0	50,0	2,8102	KNOWN	0,441	0,285
64	24	33	36,0	2400,0	80,0	0,0162	KNOWN	5,096	3,288
52	40	24	30,0	4960,0	80,0	0,0814	KNOWN	4,594	2,964
76	25	30	20,0	800,0	135,0	0,0359	KNOWN	6,524	4,209
42	26	27	16,0	3200,0	135,0	0,4261	KNOWN	0,816	0,527
31	30	26	20,0	1600,0	135,0	0,0719	KNOWN	6,221	4,013
32	26	46	20,0	1760,0	135,0	0,0791	KNOWN	3,467	2,237
78	28	27	16,0	450,0	135,0	0,0599	KNOWN	0,338	0,218
77	27	43	16,0	1600,0	135,0	0,2131	KNOWN	0,814	0,525
66	29	28	30,0	2000,0	135,0	0,0125	KNOWN	4,815	3,107
67	28	43	30,0	1920,0	135,0	0,0120	KNOWN	3,965	2,558
63	33	29	30,0	800,0	65,0	0,0193	KNOWN	4,302	2,775
71	35	29	16,0	3200,0	80,0	1,1218	KNOWN	0,072	0,046
82	31	30	16,0	3900,0	70,0	1,7503	KNOWN	0,828	0,534
27	32	31	20,0	1600,0	50,0	0,4514	KNOWN	2,590	1,671
62	34	33	24,0	1920,0	65,0	0,1372	KNOWN	1,282	0,827
60	34	35	16,0	2800,0	80,0	0,9816	KNOWN	0,692	0,446
61	37	34	24,0	880,0	75,0	0,0483	KNOWN	3,292	2,124
59	36	35	16,0	2080,0	80,0	0,7292	KNOWN	0,698	0,450
58	37	36	16,0	2230,0	80,0	0,7818	KNOWN	0,836	0,539
57	39	36	16,0	2400,0	80,0	0,8414	KNOWN	1,180	0,761
56	38	37	30,0	1280,0	80,0	0,0210	KNOWN	6,018	3,883
55	38	39	30,0	560,0	80,0	0,0092	KNOWN	0,383	0,247
53	40	38	30,0	640,0	80,0	0,0105	KNOWN	7,719	4,980
54	42	39	16,0	960,0	70,0	0,4309	KNOWN	2,114	1,364
51	41	40	30,0	1280,0	80,0	0,0210	KNOWN	14,576	9,404
50	41	42	16,0	960,0	80,0	0,3365	KNOWN	2,430	1,568
68	43	55	30,0	1280,0	70,0	0,0269	KNOWN	4,268	2,753
41	45	44	30,0	2720,0	135,0	0,0170	KNOWN	1,049	0,677
69	55	44	30,0	1600,0	135,0	0,0100	KNOWN	1,958	1,263
40	46	45	30,0	1280,0	135,0	0,0080	KNOWN	2,946	1,900
39	45	47	16,0	2400,0	55,0	1,6828	KNOWN	0,970	0,626
38	46	51	20,0	1840,0	63,0	0,3385	KNOWN	2,333	1,505
72	47	48	20,0	5290,0	0,0	99,9999	KNOWN	0,000	0.000
37	51	47	20,0	800,0	55,0	0,1892	KNOWN	0,336	0,217
35	54	48	16,0	9100,0	135,0	1,2117	KNOWN	1,999	1,290
36	51	50	20,0	880,0	110,0	0,0577	KNOWN	2,203	1,421
79	50	54	20,0	1120,0	55,0	0,2649	KNOWN	0,644	0,416
70	55	52	16,0	3700,0	55,0	2.5943	KNOWN	1,597	1,030

TABLE - SLS43
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 38 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,6		120,6
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,6		120,6
4	9	0	0	0	20,0	21,793	14,060	KNOWN	139,9		119,9
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,4		99,4
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,6		125,6
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,6		118,6
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,7		103,7
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	131,5		96,5
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,7		120,7
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	133,6		118,6
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,2		115,2
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	131,7		116,7
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	130,0		100,0
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	126,5		86,5
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	128,8		118,8
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	130,0		115,0
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,8		122,8
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	129,5		114,5
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	129,2		119,2
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	129,2		119,2
29	65	66	63	71	15,0	0,000	0,000	KNOWN	129,4		114,4
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	131,6		121,6
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	132,8		122,8
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,4		125,4
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	129,7		109,7
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,9		109,9
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	129,4		119,4
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	129,8		119,8
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	130,4		115,4
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,9		115,9
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,9		115,9
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	131,4		111,4
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,4		99,4
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,7		117,7
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	129,1		119,1
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	128,6		113,6
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	128,6		113,6
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	128,7		108,7
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	123,0		63,0
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	122,7		97,7
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,3		115,3
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	123,0		53,0
51	38	37	36	0	60,0	0,000	0,000	KNOWN	123,0		63,0
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	122,5		112,5
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	116,0		96,0
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	123,8		103,8
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	128,7		118,7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48,0	2880,0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48,0	800,0	86,0	0,0012	KNOWN	2,508	1,618
6	2	6	48,0	4960,0	86,0	0,0072	KNOWN	19,617	12,656
7	2	12	48,0	1920,0	70,0	0,0041	KNOWN	22,276	14,372
8	3	5	30,0	1600,0	65,0	0,0386	KNOWN	6,250	4,032
9	4	5	48,0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16,0	1280,0	75,0	0,5056	KNOWN	0,500	0,322
10	5	14	48,0	2080,0	120,0	0,0016	KNOWN	25,823	16,660
1	7	6	16,0	11700,0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40,0	4160,0	67,0	0,0234	KNOWN	12,676	8,178
4	6	10	48,0	1920,0	86,0	0,0028	KNOWN	27,137	17,508
16	9	8	16,0	592,0	40,0	0,7482	KNOWN	0,458	0,295
47	8	18	40,0	3200,0	67,0	0,0180	KNOWN	8,825	5,693
5	10	9	48,0	2240,0	86,0	0,0033	KNOWN	23,609	15,231
15	9	11	16,0	4000,0	40,0	5,0552	KNOWN	0,357	0,230
46	9	49	48,0	3350,0	85,0	0,0050	KNOWN	18,252	11,776
14	10	11	24,0	2720,0	35,0	0,6109	KNOWN	1,839	1,187
13	12	11	16,0	5120,0	40,0	6,4706	KNOWN	0,735	0,474
28	16	11	24,0	1650,0	30,0	0,4929	KNOWN	0,494	0,319
11	12	13	48,0	1440,0	70,0	0,0031	KNOWN	18,817	12,140
12	14	13	48,0	960,0	120,0	0,0008	KNOWN	18,622	12,014
17	13	16	48,0	5120,0	120,0	0,0040	KNOWN	34,401	22,194
18	14	15	24,0	3680,0	65,0	0,2630	KNOWN	6,007	3,875
19	17	15	16,0	3840,0	63,0	2,0943	KNOWN	1,011	0,653
73	15	20	24,0	1040,0	66,0	0,0722	KNOWN	5,065	3,268
75	16	17	30,0	950,0	80,0	0,0156	KNOWN	14,288	9,218
26	16	32	48,0	1950,0	120,0	0,0015	KNOWN	17,403	11,228
74	17	19	30,0	1200,0	80,0	0,0197	KNOWN	11,726	7,565
45	18	41	48,0	4550,0	120,0	0,0036	KNOWN	18,291	11,800
49	18	42	16,0	5600,0	70,0	2,5133	KNOWN	1,000	0,645
48	49	18	48,0	640,0	85,0	0,0010	KNOWN	12,962	8,362
20	19	20	16,0	3200,0	60,0	1,9101	KNOWN	0,944	0,609
24	19	23	30,0	5600,0	135,0	0,0349	KNOWN	10,898	7,031
25	31	19	16,0	2000,0	60,0	1,1938	KNOWN	0,952	0,615
21	20	21	24,0	6720,0	66,0	0,4668	KNOWN	2,971	1,917
23	23	21	20,0	5120,0	135,0	0,2300	KNOWN	3,477	2,243
22	21	53	20,0	8470,0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20,0	1040,0	135,0	0,0467	KNOWN	8,632	5,569
29	32	22	48,0	1920,0	120,0	0,0015	KNOWN	12,393	7,996
44	49	22	48,0	3840,0	120,0	0,0030	KNOWN	0,470	0,303
33	23	46	30,0	4800,0	135,0	0,0299	KNOWN	1,516	0,978
34	23	54	20,0	1760,0	55,0	0,4163	KNOWN	3,828	2,470
43	25	24	16,0	2560,0	64,0	1,3561	KNOWN	1,453	0,938
65	24	29	16,0	3360,0	50,0	2,8102	KNOWN	0,440	0,284
64	24	33	36,0	2400,0	80,0	0,0162	KNOWN	5,080	3,278
52	40	24	30,0	4960,0	80,0	0,0814	KNOWN	4,578	2,954
76	25	30	20,0	800,0	135,0	0,0359	KNOWN	6,497	4,191
42	26	27	16,0	3200,0	135,0	0,4261	KNOWN	0,841	0,543
31	30	26	20,0	1600,0	135,0	0,0719	KNOWN	6,183	3,989
32	26	46	20,0	1760,0	135,0	0,0791	KNOWN	3,404	2,196
78	28	27	16,0	450,0	135,0	0,0599	KNOWN	0,314	0,203
77	27	43	16,0	1600,0	135,0	0,2131	KNOWN	0,814	0,525
66	29	28	30,0	2000,0	135,0	0,0125	KNOWN	4,779	3,083
67	28	43	30,0	1920,0	135,0	0,0120	KNOWN	3,954	2,551
63	33	29	30,0	800,0	65,0	0,0193	KNOWN	4,276	2,759
71	35	29	16,0	3200,0	80,0	1,1218	KNOWN	0,064	0,041
82	31	30	16,0	3900,0	70,0	1,7503	KNOWN	0,818	0,527
27	32	31	20,0	1600,0	50,0	0,4514	KNOWN	2,592	1,672
62	34	33	24,0	1920,0	65,0	0,1372	KNOWN	1,273	0,821
60	34	35	16,0	2800,0	80,0	0,9816	KNOWN	0,689	0,444
61	37	34	24,0	880,0	75,0	0,0483	KNOWN	3,279	2,115
59	36	35	16,0	2080,0	80,0	0,7292	KNOWN	0,692	0,447
58	37	36	16,0	2230,0	80,0	0,7818	KNOWN	0,833	0,538
57	39	36	16,0	2400,0	80,0	0,8414	KNOWN	1,177	0,759
56	38	37	30,0	1280,0	80,0	0,0210	KNOWN	6,003	3,873
55	38	39	30,0	560,0	80,0	0,0092	KNOWN	0,385	0,248
53	40	38	30,0	640,0	80,0	0,0105	KNOWN	7,706	4,971
54	42	39	16,0	960,0	70,0	0,4309	KNOWN	2,109	1,361
51	41	40	30,0	1280,0	80,0	0,0210	KNOWN	14,547	9,385
50	41	42	16,0	960,0	80,0	0,3365	KNOWN	2,426	1,565
68	43	55	30,0	1280,0	70,0	0,0269	KNOWN	4,257	2,746
41	45	44	30,0	2720,0	135,0	0,0170	KNOWN	1,060	0,684
69	55	44	30,0	1600,0	135,0	0,0100	KNOWN	1,947	1,256
40	46	45	30,0	1280,0	135,0	0,0080	KNOWN	3,912	2,524
39	45	47	16,0	2400,0	55,0	1,6828	KNOWN	1,922	1,240
38	46	51	20,0	1840,0	0,0	99,9999	KNOWN	0,001	0,000
72	47	48	20,0	5290,0	135,0	0,2376	KNOWN	1,063	0,686
37	51	47	20,0	800,0	55,0	0,1892	KNOWN	0,177	0,114
35	54	48	16,0	9100,0	135,0	1,2117	KNOWN	0,936	0,604
36	50	51	20,0	880,0	110,0	0,0577	KNOWN	0,285	0,184
79	54	50	20,0	1120,0	55,0	0,2649	KNOWN	1,808	1,166
70	55	52	16,0	3700,0	55,0	2,5943	KNOWN	1,596	1,030

TABLE - SLS44
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 37 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,6		120,6
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,6		120,6
4	9	0	0	0	20,0	21,793	14,060	KNOWN	139,9		119,9
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,4		99,4
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,6		125,6
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,6		118,6
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,7		103,7
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	131,5		96,5
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,8		120,8
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	133,6		118,6
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,2		115,2
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	131,8		116,8
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	130,1		100,1
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	126,6		86,6
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	128,9		118,9
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	130,0		115,0
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,7		122,7
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	129,4		114,4
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	129,1		119,1
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	129,1		119,1
29	65	66	63	71	15,0	0,000	0,000	KNOWN	129,4		114,4
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	131,6		121,6
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	132,8		122,8
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,4		125,4
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	129,7		109,7
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,9		109,9
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	129,4		119,4
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	129,8		119,8
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	130,3		115,3
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,9		115,9
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,9		115,9
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	131,4		111,4
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,4		99,4
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,6		117,6
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	129,0		119,0
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	128,5		113,5
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	128,6		113,6
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	128,6		108,6
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	125,0		65,0
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	124,9		99,9
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,3		115,3
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	127,9		57,9
51	38	37	36	0	60,0	0,000	0,000	KNOWN	128,2		68,2
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	122,4		112,4
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	116,1		96,1
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	127,7		107,7
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	128,6		118,6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48,0	2880,0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48,0	800,0	86,0	0,0012	KNOWN	2,512	1,621
6	2	6	48,0	4960,0	86,0	0,0072	KNOWN	19,630	12,665
7	2	12	48,0	1920,0	70,0	0,0041	KNOWN	22,267	14,366
8	3	5	30,0	1600,0	65,0	0,0386	KNOWN	6,246	4,029
9	4	5	48,0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16,0	1280,0	75,0	0,5056	KNOWN	0,501	0,323
10	5	14	48,0	2080,0	120,0	0,0016	KNOWN	25,818	16,656
1	7	6	16,0	11700,0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40,0	4160,0	67,0	0,0234	KNOWN	12,682	8,182
4	6	10	48,0	1920,0	86,0	0,0028	KNOWN	27,145	17,513
16	9	8	16,0	592,0	40,0	0,7482	KNOWN	0,458	0,296
47	8	18	40,0	3200,0	67,0	0,0180	KNOWN	8,831	5,697
5	10	9	48,0	2240,0	86,0	0,0033	KNOWN	23,618	15,237
15	9	11	16,0	4000,0	40,0	5,0552	KNOWN	0,356	0,230
46	9	49	48,0	3350,0	85,0	0,0050	KNOWN	18,262	11,782
14	10	11	24,0	2720,0	35,0	0,6109	KNOWN	1,838	1,186
13	12	11	16,0	5120,0	40,0	6,4706	KNOWN	0,735	0,474
28	16	11	24,0	1650,0	30,0	0,4929	KNOWN	0,497	0,320
11	12	13	48,0	1440,0	70,0	0,0031	KNOWN	18,809	12,135
12	14	13	48,0	960,0	120,0	0,0008	KNOWN	18,634	12,022
17	13	16	48,0	5120,0	120,0	0,0040	KNOWN	34,405	22,197
18	14	15	24,0	3680,0	65,0	0,2630	KNOWN	5,990	3,865
19	17	15	16,0	3840,0	63,0	2,0943	KNOWN	1,008	0,651
73	15	20	24,0	1040,0	66,0	0,0722	KNOWN	5,045	3,255
75	16	17	30,0	950,0	80,0	0,0156	KNOWN	14,190	9,155
26	16	32	48,0	1950,0	120,0	0,0015	KNOWN	17,499	11,290
74	17	19	30,0	1200,0	80,0	0,0197	KNOWN	11,634	7,506
45	18	41	48,0	4550,0	120,0	0,0036	KNOWN	18,358	11,844
49	18	42	16,0	5600,0	70,0	2,5133	KNOWN	1,004	0,648
48	49	18	48,0	640,0	85,0	0,0010	KNOWN	13,026	8,404
20	19	20	16,0	3200,0	60,0	1,9101	KNOWN	0,945	0,610
24	19	23	30,0	5600,0	135,0	0,0349	KNOWN	10,776	6,952
25	31	19	16,0	2000,0	60,0	1,1938	KNOWN	0,929	0,600
21	20	21	24,0	6720,0	66,0	0,4668	KNOWN	2,952	1,904
23	23	21	20,0	5120,0	135,0	0,2300	KNOWN	3,496	2,255
22	21	53	20,0	8470,0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20,0	1040,0	135,0	0,0467	KNOWN	8,679	5,599
29	32	22	48,0	1920,0	120,0	0,0015	KNOWN	12,494	8,061
44	49	22	48,0	3840,0	120,0	0,0030	KNOWN	0,415	0,268
33	23	46	30,0	4800,0	135,0	0,0299	KNOWN	3,428	2,211
34	23	54	20,0	1760,0	55,0	0,4163	KNOWN	1,765	1,139
43	25	24	16,0	2560,0	64,0	1,3561	KNOWN	1,460	0,942
65	24	29	16,0	3360,0	50,0	2,8102	KNOWN	0,444	0,286
64	24	33	36,0	2400,0	80,0	0,0162	KNOWN	5,115	3,300
52	40	24	30,0	4960,0	80,0	0,0814	KNOWN	4,610	2,974
76	25	30	20,0	800,0	135,0	0,0359	KNOWN	6,537	4,218
42	26	27	16,0	3200,0	135,0	0,4261	KNOWN	0,828	0,534
31	30	26	20,0	1600,0	135,0	0,0719	KNOWN	6,241	4,027
32	26	46	20,0	1760,0	135,0	0,0791	KNOWN	3,480	2,245
78	28	27	16,0	450,0	135,0	0,0599	KNOWN	0,337	0,217
77	27	43	16,0	1600,0	135,0	0,2131	KNOWN	0,823	0,531
66	29	28	30,0	2000,0	135,0	0,0125	KNOWN	4,857	3,134
67	28	43	30,0	1920,0	135,0	0,0120	KNOWN	4,009	2,586
63	33	29	30,0	800,0	65,0	0,0193	KNOWN	4,332	2,795
71	35	29	16,0	3200,0	80,0	1,1218	KNOWN	0,081	0,053
82	31	30	16,0	3900,0	70,0	1,7503	KNOWN	0,836	0,539
27	32	31	20,0	1600,0	50,0	0,4514	KNOWN	2,587	1,669
62	34	33	24,0	1920,0	65,0	0,1372	KNOWN	1,293	0,834
60	34	35	16,0	2800,0	80,0	0,9816	KNOWN	0,696	0,449
61	37	34	24,0	880,0	75,0	0,0483	KNOWN	3,307	2,133
59	36	35	16,0	2080,0	80,0	0,7292	KNOWN	0,703	0,454
58	37	36	16,0	2230,0	80,0	0,7818	KNOWN	0,838	0,541
57	39	36	16,0	2400,0	80,0	0,8414	KNOWN	1,183	0,763
56	38	37	30,0	1280,0	80,0	0,0210	KNOWN	6,036	3,894
55	38	39	30,0	560,0	80,0	0,0092	KNOWN	0,381	0,246
53	40	38	30,0	640,0	80,0	0,0105	KNOWN	7,731	4,988
54	42	39	16,0	960,0	70,0	0,4309	KNOWN	2,120	1,368
51	41	40	30,0	1280,0	80,0	0,0210	KNOWN	14,609	9,425
50	41	42	16,0	960,0	80,0	0,3365	KNOWN	2,434	1,570
68	43	55	30,0	1280,0	70,0	0,0269	KNOWN	4,321	2,787
41	45	44	30,0	2720,0	135,0	0,0170	KNOWN	0,996	0,642
69	55	44	30,0	1600,0	135,0	0,0100	KNOWN	2,011	1,297
40	46	45	30,0	1280,0	135,0	0,0080	KNOWN	3,391	2,187
39	45	47	16,0	2400,0	55,0	1,6828	KNOWN	1,499	0,967
38	46	51	20,0	1840,0	135,0	0,0826	KNOWN	2,351	1,517
72	47	48	20,0	5290,0	135,0	0,2376	KNOWN	0,429	0,277
37	51	47	20,0	800,0	0,0	99,9999	KNOWN	0,001	0,001
35	54	48	16,0	9100,0	135,0	1,2117	KNOWN	1,569	1,012
36	51	50	20,0	880,0	110,0	0,0577	KNOWN	2,469	1,593
79	50	54	20,0	1120,0	55,0	0,2649	KNOWN	0,834	0,538
70	55	52	16,0	3700,0	55,0	2,5943	KNOWN	1,597	1,030

TABLE – SLS45
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 36 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,6		120,6
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,6		120,6
4	9	0	0	0	20,0	21,793	14,060	KNOWN	139,9		119,9
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,4		99,4
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,6		125,6
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,6		118,6
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,7		103,7
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	131,5		96,5
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,7		120,7
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	133,6		118,6
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,2		115,2
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	131,7		116,7
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	130,0		100,0
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	126,5		86,5
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	128,9		118,9
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	130,0		115,0
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,7		122,7
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	129,5		114,5
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	129,2		119,2
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	129,2		119,2
29	65	66	63	71	15,0	0,000	0,000	KNOWN	129,4		114,4
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	131,6		121,6
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	132,8		122,8
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,4		125,4
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	129,7		109,7
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,9		109,9
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	129,4		119,4
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	129,8		119,8
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	130,3		115,3
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,9		115,9
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,9		115,9
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	131,4		111,4
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,4		99,4
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,7		117,7
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	129,0		119,0
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	128,6		113,6
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	128,6		113,6
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	128,7		108,7
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	127,9		67,9
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	126,9		101,9
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,3		115,3
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	126,0		56,0
51	38	37	36	0	60,0	0,000	0,000	KNOWN	128,2		68,2
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	122,5		112,5
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	116,0		96,0
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	126,7		106,7
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	128,6		118,6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67,0	0,0067	KNOWN	28,241	18.220
81	3	2	48.0	800.0	86,0	0,0012	KNOWN	2,510	1.619
6	2	6	48.0	4960.0	86,0	0,0072	KNOWN	19,624	12.660
7	2	12	48.0	1920.0	70,0	0,0041	KNOWN	22,272	14.369
8	3	5	30.0	1600.0	65,0	0,0386	KNOWN	6,248	4.031
9	4	5	48.0	2000.0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,500	0.323
10	5	14	48.0	2080.0	120,0	0,0016	KNOWN	25,820	16,658
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0.450
3	6	8	40.0	4160.0	67,0	0,0234	KNOWN	12,679	8,180
4	6	10	48.0	1920.0	86,0	0,0028	KNOWN	27,141	17,511
16	9	8	16.0	592.0	40,0	0,7482	KNOWN	0,458	0,295
47	8	18	40.0	3200.0	67,0	0,0180	KNOWN	8,828	5.695
5	10	9	48.0	2240.0	86,0	0,0033	KNOWN	23,613	15,234
15	9	11	16.0	4000.0	40,0	5,0552	KNOWN	0,357	0.230
46	9	49	48.0	3350.0	85,0	0,0050	KNOWN	18,257	11,779
14	10	11	24.0	2720.0	35,0	0,6109	KNOWN	1,839	1,186
13	12	11	16.0	5120.0	40,0	6,4706	KNOWN	0,735	0.474
28	16	11	24.0	1650.0	30,0	0,4929	KNOWN	0,496	0.320
11	12	13	48.0	1440.0	70,0	0,0031	KNOWN	18,813	12,137
12	14	13	48.0	960.0	120,0	0.0008	KNOWN	18,628	12.018
17	13	16	48.0	5120.0	120,0	0,0040	KNOWN	34,403	22.196
18	14	15	24.0	3680.0	65,0	0,2630	KNOWN	5,998	3,870
19	17	15	16.0	3840.0	63,0	2,0943	KNOWN	1,010	0,652
73	15	20	24.0	1040.0	66,0	0,0722	KNOWN	5,055	3,261
75	16	17	30.0	950.0	80,0	0,0156	KNOWN	14,239	9,186
26	16	32	48.0	1950.0	120,0	0.0015	KNOWN	17,453	11.260
74	17	19	30.0	1200.0	80,0	0,0197	KNOWN	11,679	7.535
45	18	41	48.0	4550.0	120,0	0,0036	KNOWN	18,320	11,819
49	18	42	16.0	5600.0	70,0	2,5133	KNOWN	1,002	0,646
48	49	18	48.0	640.0	85,0	0,0010	KNOWN	12,989	8.380
20	19	20	16.0	3200.0	60,0	1,9101	KNOWN	0,944	0,609
24	19	23	30.0	5600.0	135,0	0.0349	KNOWN	10,837	6.992
25	31	19	16.0	2000.0	60,0	1,1938	KNOWN	0,940	0.607
21	20	21	24.0	6720.0	66,0	0,4668	KNOWN	2,962	1,911
23	23	21	20.0	5120.0	135,0	0,2300	KNOWN	3,486	2,249
22	21	53	20.0	8470.0	70,0	1,2823	KNOWN	3,116	2.010
30	22	25	20.0	1040.0	135,0	0,0467	KNOWN	8,661	5,588
29	32	22	48.0	1920.0	120,0	0.0015	KNOWN	12,445	8.029
44	49	22	48.0	3840.0	120,0	0,0030	KNOWN	0,448	0,289
33	23	46	30.0	4800.0	135,0	0,0299	KNOWN	2,820	1,819
34	23	54	20.0	1760.0	55,0	0,4163	KNOWN	2,457	1,585
43	25	24	16.0	2560.0	64,0	1,3561	KNOWN	1,455	0.938
65	24	29	16.0	3360.0	50,0	2,8102	KNOWN	0,441	0.285
64	24	33	36.0	2400.0	80,0	0,0162	KNOWN	5,094	3.286
52	40	24	30.0	4960.0	80,0	0,0814	KNOWN	4,592	2,963
76	25	30	20.0	800.0	135,0	0,0359	KNOWN	6,525	4.209
42	26	27	16.0	3200.0	135,0	0,4261	KNOWN	0,810	0,522
31	30	26	20.0	1600.0	135,0	0,0719	KNOWN	6,221	4.014
32	26	46	20.0	1760.0	135,0	0,0791	KNOWN	3,474	2,241
78	28	27	16.0	450.0	135,0	0,0599	KNOWN	0,342	0.221
77	27	43	16.0	1600.0	135,0	0,2131	KNOWN	0,811	0,523
66	29	28	30.0	2000.0	135,0	0,0125	KNOWN	4,810	3,104
67	28	43	30.0	1920.0	135,0	0,0120	KNOWN	3,957	2,553
63	33	29	30.0	800.0	65,0	0,0193	KNOWN	4,298	2,773
71	35	29	16.0	3200.0	80,0	1,1218	KNOWN	0,071	0,046
82	31	30	16.0	3900.0	70,0	1.7503	KNOWN	0,828	0,534
27	32	31	20.0	1600.0	50,0	0,4514	KNOWN	2,590	1.671
62	34	33	24.0	1920.0	65,0	0.1372	KNOWN	1,281	0.827
60	34	35	16.0	2800.0	80,0	0,9816	KNOWN	0,692	0,446
61	37	34	24.0	880.0	75,0	0,0483	KNOWN	3,290	2.123
59	36	35	16.0	2080.0	80,0	0,7292	KNOWN	0,697	0.450
58	37	36	16.0	2230.0	80,0	0,7818	KNOWN	0,835	0.539
57	39	36	16.0	2400.0	80,0	0,8414	KNOWN	1,179	0,761
56	38	37	30.0	1280.0	80,0	0,0210	KNOWN	6,017	3,882
55	38	39	30.0	560.0	80,0	0,0092	KNOWN	0,383	0,247
53	40	38	30.0	640.0	80,0	0,0105	KNOWN	7,717	4,979
54	42	39	16.0	960.0	70,0	0,4309	KNOWN	2,114	1.364
51	41	40	30.0	1280.0	80,0	0,0210	KNOWN	14,572	9.401
50	41	42	16.0	960.0	80,0	0.3365	KNOWN	2,429	1.567
68	43	55	30.0	1280.0	70,0	0,0269	KNOWN	4,256	2,746
41	45	44	30.0	2720.0	135,0	0,0170	KNOWN	1,060	0,684
69	55	44	30.0	1600.0	135,0	0,0100	KNOWN	1,947	1,256
40	46	45	30.0	1280.0	135,0	0,0080	KNOWN	2,640	1,703
39	45	47	16.0	2400.0	55,0	1.6828	KNOWN	0,613	0,395
38	46	51	20.0	1840.0	135,0	0,0826	KNOWN	2,679	1,728
72	47	48	20.0	5290.0	135,0	0.2376	KNOWN	2,222	1.433
37	51	47	20.0	800.0	135,0	0,0359	KNOWN	2,627	1,695
35	48	54	16.0	9100.0	135,0	1,2117	KNOWN	0,403	0.260
36	51	50	20.0	880.0	0,0	99,9999	KNOWN	0,001	0,000
79	54	50	20.0	1120.0	55,0	0,2649	KNOWN	1,596	1,030
70	55	52	16.0	3700.0	55,0	2,5943	KNOWN	1,596	1,030

TABLE – SLS46
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 79 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,6		120,6
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,6		120,6
4	9	0	0	0	20,0	21,793	14,060	KNOWN	139,9		119,9
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,4		99,4
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,6		125,6
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,6		118,6
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,7		103,7
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	131,5		96,5
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,8		120,8
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	133,6		118,6
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,2		115,2
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	131,8		116,8
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	130,1		100,1
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	126,6		86,6
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	128,9		118,9
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	130,0		115,0
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,7		122,7
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	129,4		114,4
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	129,1		119,1
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	129,1		119,1
29	65	66	63	71	15,0	0,000	0,000	KNOWN	129,4		114,4
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	131,6		121,6
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	132,8		122,8
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,4		125,4
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	129,7		109,7
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,9		109,9
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	129,4		119,4
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	129,8		119,8
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	130,3		115,3
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,9		115,9
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,9		115,9
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	131,4		111,4
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,4		99,4
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,6		117,6
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	129,0		119,0
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	128,6		113,6
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	128,6		113,6
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	128,6		108,6
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	127,7		67,7
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	127,3		102,3
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,3		115,3
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	127,8		57,8
51	38	37	36	0	60,0	0,000	0,000	KNOWN	127,8		67,8
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	122,4		112,4
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	116,1		96,1
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	127,8		107,8
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	128,6		118,6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67,0	0,0067	KNOWN	28,241	18.220
81	3	2	48.0	800.0	86,0	0,0012	KNOWN	2,512	1.621
6	2	6	48.0	4960.0	86,0	0,0072	KNOWN	19,630	12.665
7	2	12	48.0	1920.0	70,0	0,0041	KNOWN	22,267	14.366
8	3	5	30.0	1600.0	65,0	0,0386	KNOWN	6,246	4.029
9	4	5	48.0	2000.0	120,0	0,0016	KNOWN	21,793	14.060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,501	0.323
10	5	14	48.0	2080.0	120,0	0,0016	KNOWN	25,818	16.656
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0.450
3	6	8	40.0	4160.0	67,0	0,0234	KNOWN	12,681	8,182
4	6	10	48.0	1920.0	86,0	0.0028	KNOWN	27,145	17.513
16	9	8	16.0	592.0	40,0	0,7482	KNOWN	0,458	0,296
47	8	18	40.0	3200.0	67,0	0,0180	KNOWN	8,831	5,697
5	10	9	48.0	2240.0	86,0	0,0033	KNOWN	23,618	15.237
15	9	11	16.0	4000.0	40,0	5,0552	KNOWN	0,356	0.230
46	9	49	48.0	3350.0	85,0	0.0050	KNOWN	18,262	11,782
14	10	11	24.0	2720.0	35,0	0.6109	KNOWN	1,838	1.186
13	12	11	16.0	5120.0	40,0	6,4706	KNOWN	0,735	0.474
28	16	11	24.0	1650.0	30,0	0.4929	KNOWN	0,497	0.320
11	12	13	48.0	1440.0	70,0	0,0031	KNOWN	18,809	12.135
12	14	13	48.0	960.0	120,0	0,0008	KNOWN	18,634	12.022
17	13	16	48.0	5120.0	120,0	0,0040	KNOWN	34,405	22,197
18	14	15	24.0	3680.0	65,0	0,2630	KNOWN	5,990	3.865
19	17	15	16.0	3840.0	63,0	2,0943	KNOWN	1,008	0,651
73	15	20	24.0	1040.0	66,0	0,0722	KNOWN	5,046	3.255
75	16	17	30.0	950.0	80,0	0,0156	KNOWN	14,193	9.156
26	16	32	48.0	1950.0	120,0	0,0015	KNOWN	17,499	11.290
74	17	19	30.0	1200.0	80,0	0,0197	KNOWN	11,634	7.506
45	18	41	48.0	4550.0	120,0	0.0036	KNOWN	18,353	11.841
49	18	42	16.0	5600.0	70,0	2,5133	KNOWN	1,003	0.647
48	49	18	48.0	640.0	85,0	0.0010	KNOWN	13.021	8.401
20	19	20	16.0	3200.0	60,0	1,9101	KNOWN	0,945	0,610
24	19	23	30.0	5600.0	135,0	0.0349	KNOWN	10,781	6.956
25	31	19	16.0	2000.0	60,0	1.1938	KNOWN	0.929	0.599
21	20	21	24.0	6720.0	66,0	0.4668	KNOWN	2,953	1,905
23	23	21	20.0	5120.0	135,0	0,2300	KNOWN	3,495	2.255
22	21	53	20.0	8470.0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20.0	1040.0	135,0	0,0467	KNOWN	8,682	5.601
29	32	22	48.0	1920.0	120,0	0.0015	KNOWN	12,494	8.060
44	49	22	48.0	3840.0	120,0	0,0030	KNOWN	0,420	0.271
33	23	46	30.0	4800.0	135,0	0,0299	KNOWN	3,504	2.260
34	23	54	20.0	1760.0	55,0	0,4163	KNOWN	1,705	1.100
43	25	24	16.0	2560.0	64,0	1,3561	KNOWN	1,458	0,941
65	24	29	16.0	3360.0	50,0	2,8102	KNOWN	0,443	0,286
64	24	33	36.0	2400.0	80,0	0.0162	KNOWN	5,112	3.298
52	40	24	30.0	4960.0	80,0	0,0814	KNOWN	4,608	2,973
76	25	30	20.0	800.0	135,0	0,0359	KNOWN	6,542	4.221
42	26	27	16.0	3200.0	135,0	0,4261	KNOWN	0,809	0.522
31	30	26	20.0	1600.0	135,0	0,0719	KNOWN	6,247	4.030
32	26	46	20.0	1760.0	135,0	0,0791	KNOWN	3,500	2,258
78	28	27	16.0	450.0	135.0	0.0599	KNOWN	0,349	0.225
77	27	43	16.0	1600.0	135,0	0,2131	KNOWN	0,817	0,527
66	29	28	30.0	2000.0	135,0	0.0125	KNOWN	4,850	3.129
67	28	43	30.0	1920.0	135,0	0,0120	KNOWN	3,989	2,574
63	33	29	30.0	800.0	65,0	0,0193	KNOWN	4,326	2,791
71	35	29	16.0	3200.0	80,0	1.1218	KNOWN	0,080	0,052
82	31	30	16.0	3900.0	70,0	1,7503	KNOWN	0,837	0.540
27	32	31	20.0	1600.0	50,0	0,4514	KNOWN	2.587	1.669
62	34	33	24.0	1920.0	65,0	0,1372	KNOWN	1,292	0.833
60	34	35	16.0	2800.0	80,0	0,9816	KNOWN	0,695	0.448
61	37	34	24.0	880.0	75,0	0,0483	KNOWN	3,304	2.132
59	36	35	16.0	2080.0	80,0	0.7292	KNOWN	0,702	0.453
58	37	36	16.0	2230.0	80,0	0,7818	KNOWN	0,837	0.540
57	39	36	16.0	2400.0	80,0	0.8414	KNOWN	1,182	0.763
56	38	37	30.0	1280.0	80,0	0,0210	KNOWN	6,033	3.892
55	38	39	30.0	560.0	80,0	0,0092	KNOWN	0,381	0.246
53	40	38	30.0	640.0	80,0	0,0105	KNOWN	7,731	4,988
54	42	39	16.0	960.0	70,0	0.4309	KNOWN	2.119	1.367
51	41	40	30.0	1280.0	80,0	0,0210	KNOWN	14,603	9.421
50	41	42	16.0	960.0	80,0	0,3365	KNOWN	2,433	1,570
68	43	55	30.0	1280.0	70,0	0,0269	KNOWN	4,295	2,771
41	45	44	30.0	2720.0	135,0	0.0170	KNOWN	1,021	0.659
69	55	44	30.0	1600.0	135,0	0,0100	KNOWN	1,986	1.281
40	46	45	30.0	1280.0	135,0	0,0080	KNOWN	2,636	1.701
39	45	47	16.0	2400.0	55,0	1,6828	KNOWN	0,685	0.442
38	46	51	20.0	1840.0	135,0	0,0826	KNOWN	3,360	2,168
72	47	48	20.0	5290.0	135,0	0,2376	KNOWN	1,379	0.890
37	51	47	20.0	800.0	135,0	0.0359	KNOWN	1,764	1.138
35	54	48	16.0	9100.0	135,0	1,2117	KNOWN	0,620	0,400
36	51	50	20.0	880.0	135,0	0,0395	KNOWN	1,353	0.873
79	54	50	20.0	1120.0	0,0	99,9999	KNOWN	0,000	0.000
70	55	52	16.0	3700.0	55,0	2,5943	KNOWN	1,596	1.030

TABLE - SLS47
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 34 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,6		120,6
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,6		120,6
4	9	0	0	0	20,0	21,793	14,060	KNOWN	139,9		119,9
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,4		99,4
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,6		125,6
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,6		118,6
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,7		103,7
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	131,6		96,6
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,8		120,8
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	133,7		118,7
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,2		115,2
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	131,9		116,9
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	130,1		100,1
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	126,7		86,7
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	129,1		119,1
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	129,9		114,9
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,7		122,7
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	129,3		114,3
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	129,0		119,0
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	129,0		119,0
29	65	66	63	71	15,0	0,000	0,000	KNOWN	129,3		114,3
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	131,5		121,5
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	132,8		122,8
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,4		125,4
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	129,6		109,6
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,8		109,8
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	129,3		119,3
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	129,7		119,7
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	130,3		115,3
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,9		115,9
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,9		115,9
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	131,3		111,3
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,4		99,4
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,6		117,6
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	128,9		118,9
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	128,4		113,4
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	128,4		113,4
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	128,5		108,5
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	126,9		66,9
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	126,3		101,3
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,3		115,3
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	126,7		56,7
51	38	37	36	0	60,0	0,000	0,000	KNOWN	127,0		67,0
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	122,3		112,3
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	116,2		96,2
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	126,6		106,6
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	128,5		118,5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48.0	800.0	86,0	0,0012	KNOWN	2,516	1,623
6	2	6	48.0	4960.0	86,0	0,0072	KNOWN	19,643	12,673
7	2	12	48,0	1920,0	70,0	0,0041	KNOWN	22,258	14,360
8	3	5	30.0	1600.0	65,0	0,0386	KNOWN	6,241	4,027
9	4	5	48.0	2000.0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,502	0,324
10	5	14	48.0	2080.0	120,0	0,0016	KNOWN	25,812	16,653
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40,0	4160.0	67,0	0,0234	KNOWN	12,687	8,185
4	6	10	48.0	1920.0	86,0	0,0028	KNOWN	27,153	17,518
16	9	8	16.0	592.0	40,0	0,7482	KNOWN	0,459	0,296
47	8	18	40.0	3200.0	67,0	0,0180	KNOWN	8,837	5,702
5	10	9	48.0	2240.0	86,0	0,0033	KNOWN	23,627	15,243
15	9	11	16.0	4000.0	40,0	5,0552	KNOWN	0,355	0,229
46	9	49	48,0	3350,0	85,0	0,0050	KNOWN	18,271	11,788
14	10	11	24.0	2720.0	35,0	0,6109	KNOWN	1,836	1,185
13	12	11	16.0	5120.0	40,0	6,4706	KNOWN	0,735	0,474
28	16	11	24.0	1650.0	30,0	0,4929	KNOWN	0,499	0,322
11	12	13	48.0	1440.0	70,0	0,0031	KNOWN	18,801	12,130
12	14	13	48.0	960.0	120,0	0,0008	KNOWN	18,645	12,029
17	13	16	48,0	5120,0	120,0	0,0040	KNOWN	34,408	22,199
18	14	15	24.0	3680.0	65,0	0,2630	KNOWN	5,968	3,850
19	17	15	16.0	3840.0	63,0	2,0943	KNOWN	1,005	0,648
73	15	20	24.0	1040.0	66,0	0,0722	KNOWN	5,020	3,239
75	16	17	30.0	950.0	80,0	0,0156	KNOWN	14,065	9,074
26	16	32	48.0	1950.0	120,0	0,0015	KNOWN	17,595	11,352
74	17	19	30,0	1200,0	80,0	0,0197	KNOWN	11,496	7,417
45	18	41	48.0	4550.0	120,0	0,0036	KNOWN	18,459	11,909
49	18	42	16.0	5600.0	70,0	2,5133	KNOWN	1,008	0,650
48	49	18	48.0	640.0	85,0	0,0010	KNOWN	13,089	8,445
20	19	20	16.0	3200.0	60,0	1,9101	KNOWN	0,949	0,612
24	19	23	30.0	5600.0	135,0	0,0349	KNOWN	10,619	6,851
25	31	19	16.0	2000.0	60,0	1,1938	KNOWN	0,897	0,579
21	20	21	24.0	6720.0	66,0	0,4668	KNOWN	2,925	1,887
23	23	21	20.0	5120.0	135,0	0,2300	KNOWN	3,520	2,271
22	21	53	20.0	8470.0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20.0	1040.0	135,0	0,0467	KNOWN	8,739	5,638
29	32	22	48.0	1920.0	120,0	0,0015	KNOWN	12,596	8,126
44	49	22	48,0	3840.0	120,0	0,0030	KNOWN	0,360	0,232
33	23	46	30.0	4800.0	135,0	0,0299	KNOWN	5,018	3,237
34	23	54	20.0	1760.0	0,0	99,9999	KNOWN	0,000	0,000
43	25	24	16.0	2560.0	64,0	1,3561	KNOWN	1,470	0,948
65	24	29	16.0	3360.0	50,0	2,8102	KNOWN	0,450	0,290
64	24	33	36.0	2400.0	80,0	0,0162	KNOWN	5,164	3,331
52	40	24	30.0	4960.0	80,0	0,0814	KNOWN	4,662	3,008
76	25	30	20.0	800.0	135,0	0,0359	KNOWN	6,588	4,250
42	26	27	16.0	3200.0	135,0	0,4261	KNOWN	0,812	0,524
31	30	26	20.0	1600.0	135,0	0,0719	KNOWN	6,326	4,082
32	26	46	20.0	1760.0	135,0	0,0791	KNOWN	3,571	2,304
78	28	27	16.0	450.0	135,0	0,0599	KNOWN	0,366	0,236
77	27	43	16.0	1600.0	135,0	0,2131	KNOWN	0,836	0,540
66	29	28	30.0	2000.0	135,0	0,0125	KNOWN	4,964	3,203
67	28	43	30.0	1920.0	135,0	0,0120	KNOWN	4,087	2,637
63	33	29	30.0	800.0	65,0	0,0193	KNOWN	4,409	2,845
71	35	29	16.0	3200.0	80,0	1,1218	KNOWN	0,105	0,068
82	31	30	16.0	3900.0	70,0	1,7503	KNOWN	0,859	0,554
27	32	31	20.0	1600.0	50,0	0,4514	KNOWN	2,580	1,665
62	34	33	24.0	1920.0	65,0	0,1372	KNOWN	1,337	0,863
60	34	35	16.0	2800.0	80,0	0,9816	KNOWN	0,709	0,457
61	37	34	24.0	880.0	75,0	0,0483	KNOWN	3,342	2,156
59	36	35	16.0	2080.0	80,0	0,7292	KNOWN	0,722	0,466
58	37	36	16.0	2230.0	80,0	0,7818	KNOWN	0,843	0,544
57	39	36	16.0	2400.0	80,0	0,8414	KNOWN	1,191	0,768
56	38	37	30.0	1280.0	80,0	0,0210	KNOWN	6,077	3,920
55	38	39	30.0	560.0	80,0	0,0092	KNOWN	0,375	0,242
53	40	38	30.0	640.0	80,0	0,0105	KNOWN	7,769	5,012
54	42	39	16.0	960.0	70,0	0,4309	KNOWN	2,134	1,376
51	41	40	30.0	1280.0	80,0	0,0210	KNOWN	14,685	9,474
50	41	42	16.0	960.0	80,0	0,3365	KNOWN	2,443	1,576
68	43	55	30.0	1280.0	70,0	0,0269	KNOWN	4,412	2,847
41	45	44	30.0	2720.0	135,0	0,0170	KNOWN	0,904	0,583
69	55	44	30.0	1600.0	135,0	0,0100	KNOWN	2,103	1,357
40	46	45	30.0	1280.0	135,0	0,0080	KNOWN	2,790	1,800
39	45	47	16.0	2400.0	55,0	1,6828	KNOWN	0,955	0,616
38	46	51	20.0	1840.0	135,0	0,0826	KNOWN	4,791	3,091
72	47	48	20.0	5290.0	135,0	0,2376	KNOWN	1,585	1,023
37	51	47	20.0	800.0	135,0	0,0359	KNOWN	1,699	1,096
35	54	48	16.0	9100.0	135,0	1,2117	KNOWN	0,414	0,267
36	51	50	20.0	880.0	135,0	0,0395	KNOWN	3,065	1,977
79	50	54	20.0	1120.0	135,0	0,0503	KNOWN	1,470	0,948
70	55	52	16.0	3700.0	55,0	2,5943	KNOWN	1,597	1,030

TABLE - SLS48
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 21 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,6		120,6
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,6		120,6
4	9	0	0	0	20,0	21,793	14,060	KNOWN	140,0		120,0
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,5		99,5
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,3		126,3
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,6		125,6
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,6		118,6
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,8		103,8
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	133,3		98,3
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,7		120,7
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	133,7		118,7
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,1		115,1
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	131,7		116,7
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	132,5		102,5
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	120,6		80,6
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,2		125,2
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	127,8		117,8
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	129,6		114,6
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,5		122,5
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	128,8		113,8
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	128,5		118,5
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	128,5		118,5
29	65	66	63	71	15,0	0,000	0,000	KNOWN	128,8		113,8
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	131,2		121,2
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	132,7		122,7
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,4		125,4
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	129,2		109,2
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,5		109,5
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	128,9		118,9
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	129,4		119,4
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	130,0		115,0
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,6		115,6
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,6		115,6
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	131,1		111,1
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,3		99,3
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,5		117,5
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	128,3		118,3
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	127,8		112,8
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	127,8		112,8
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	127,8		107,8
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	127,2		67,2
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	126,8		101,8
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,2		115,2
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	127,3		57,3
51	38	37	36	0	60,0	0,000	0,000	KNOWN	127,3		67,3
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	121,7		111,7
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	110,1		90,1
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	127,4		107,4
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	127,8		117,8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48.0	800.0	86,0	0,0012	KNOWN	2,609	1,683
6	2	6	48.0	4960.0	86,0	0,0072	KNOWN	19,894	12,835
7	2	12	48.0	1920.0	70,0	0,0041	KNOWN	22,101	14,258
8	3	5	30.0	1600.0	65,0	0,0386	KNOWN	6,148	3,966
9	4	5	48.0	2000.0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,530	0,342
10	5	14	48.0	2080.0	120,0	0,0016	KNOWN	25,691	16,575
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40.0	4160.0	67,0	0,0234	KNOWN	12,775	8,242
4	6	10	48.0	1920.0	86,0	0,0028	KNOWN	27,315	17,623
16	9	8	16.0	592.0	40,0	0,7482	KNOWN	0,465	0,300
47	8	18	40.0	3200.0	67,0	0,0180	KNOWN	8,931	5,762
5	10	9	48.0	2240.0	86,0	0,0033	KNOWN	23,792	15,349
15	9	11	16.0	4000.0	40,0	5,0552	KNOWN	0,350	0,226
46	9	49	48.0	3350.0	85,0	0,0050	KNOWN	18,434	11,893
14	10	11	24.0	2720.0	35,0	0,6109	KNOWN	1,835	1,184
13	12	11	16.0	5120.0	40,0	6,4706	KNOWN	0,743	0,479
28	16	11	24.0	1650.0	30,0	0,4929	KNOWN	0,498	0,321
11	12	13	48.0	1440.0	70,0	0,0031	KNOWN	18,664	12,041
12	14	13	48.0	960.0	120,0	0,0008	KNOWN	19,320	12,465
17	13	16	48.0	5120.0	120,0	0,0040	KNOWN	34,930	22,536
18	14	15	24.0	3680.0	65,0	0,2630	KNOWN	5,191	3,349
19	17	15	16.0	3840.0	63,0	2,0943	KNOWN	0,413	0,266
73	15	20	24.0	1040.0	66,0	0,0722	KNOWN	3,651	2,355
75	16	17	30.0	950.0	80,0	0,0156	KNOWN	13,985	9,022
26	16	32	48.0	1950.0	120,0	0,0015	KNOWN	18,233	11,763
74	17	19	30.0	1200.0	80,0	0,0197	KNOWN	12,022	7,756
45	18	41	48.0	4550.0	120,0	0,0036	KNOWN	18,903	12,196
49	18	42	16.0	5600.0	70,0	2,5133	KNOWN	1,030	0,665
48	49	18	48.0	640.0	85,0	0,0010	KNOWN	13,497	8,708
20	20	19	16.0	3200.0	60,0	1,9101	KNOWN	0,612	0,395
24	19	23	30.0	5600.0	135,0	0,0349	KNOWN	12,696	8,191
25	31	19	16.0	2000.0	60,0	1,1938	KNOWN	0,899	0,580
21	20	21	24.0	6720.0	0,0	99,9999	KNOWN	0,001	0,001
23	23	21	20.0	5120.0	135,0	0,2300	KNOWN	6,447	4,159
22	21	53	20.0	8470.0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20.0	1040.0	135,0	0,0467	KNOWN	9,057	5,843
29	32	22	48.0	1920.0	120,0	0,0015	KNOWN	13,170	8,497
44	49	22	48.0	3840.0	120,0	0,0030	KNOWN	0,102	0,066
33	23	46	30.0	4800.0	135,0	0,0299	KNOWN	1,236	0,798
34	23	54	20.0	1760.0	135,0	0,0791	KNOWN	2,647	1,708
43	25	24	16.0	2560.0	64,0	1,3561	KNOWN	1,512	0,976
65	24	29	16.0	3360.0	50,0	2,8102	KNOWN	0,479	0,309
64	24	33	36.0	2400.0	80,0	0,0162	KNOWN	5,402	3,485
52	40	24	30.0	4960.0	80,0	0,0814	KNOWN	4,881	3,149
76	25	30	20.0	800.0	135,0	0,0359	KNOWN	6,862	4,427
42	26	27	16.0	3200.0	135,0	0,4261	KNOWN	0,786	0,507
31	30	26	20.0	1600.0	135,0	0,0719	KNOWN	6,648	4,289
32	26	46	20.0	1760.0	135,0	0,0791	KNOWN	3,924	2,532
78	28	27	16.0	450.0	135,0	0,0599	KNOWN	0,467	0,302
77	27	43	16.0	1600.0	135,0	0,2131	KNOWN	0,913	0,589
66	29	28	30.0	2000.0	135,0	0,0125	KNOWN	5,486	3,539
67	28	43	30.0	1920.0	135,0	0,0120	KNOWN	4,507	2,908
63	33	29	30.0	800.0	65,0	0,0193	KNOWN	4,796	3,094
71	35	29	16.0	3200.0	80,0	1,1218	KNOWN	0,211	0,136
82	31	30	16.0	3900.0	70,0	1,7503	KNOWN	0,918	0,592
27	32	31	20.0	1600.0	50,0	0,4514	KNOWN	2,638	1,702
62	34	33	24.0	1920.0	65,0	0,1372	KNOWN	1,470	0,949
60	34	35	16.0	2800.0	80,0	0,9816	KNOWN	0,745	0,481
61	37	34	24.0	880.0	75,0	0,0483	KNOWN	3,533	2,279
59	36	35	16.0	2080.0	80,0	0,7292	KNOWN	0,784	0,506
58	37	36	16.0	2230.0	80,0	0,7818	KNOWN	0,870	0,561
57	39	36	16.0	2400.0	80,0	0,8414	KNOWN	1,231	0,794
56	38	37	30.0	1280.0	80,0	0,0210	KNOWN	6,294	4,060
55	38	39	30.0	560.0	80,0	0,0092	KNOWN	0,342	0,221
53	40	38	30.0	640.0	80,0	0,0105	KNOWN	7,953	5,131
54	42	39	16.0	960.0	70,0	0,4309	KNOWN	2,206	1,423
51	41	40	30.0	1280.0	80,0	0,0210	KNOWN	15,099	9,741
50	41	42	16.0	960.0	80,0	0,3365	KNOWN	2,494	1,609
68	43	55	30.0	1280.0	70,0	0,0269	KNOWN	4,908	3,167
41	45	44	30.0	2720.0	135,0	0,0170	KNOWN	0,408	0,263
69	55	44	30.0	1600.0	135,0	0,0100	KNOWN	2,599	1,677
40	46	45	30.0	1280.0	135,0	0,0080	KNOWN	1,888	1,218
39	45	47	16.0	2400.0	55,0	1,6828	KNOWN	0,550	0,355
38	46	51	20.0	1840.0	135,0	0,0826	KNOWN	2,553	1,647
72	47	48	20.0	5290.0	135,0	0,2376	KNOWN	1,342	0,866
37	51	47	20.0	800.0	135,0	0,0359	KNOWN	1,861	1,201
35	54	48	16.0	9100.0	135,0	1,2117	KNOWN	0,657	0,424
36	51	50	20.0	880.0	135,0	0,0395	KNOWN	0,420	0,271
79	54	50	20.0	1120.0	135,0	0,0503	KNOWN	0,903	0,583
70	55	52	16.0	3700.0	55,0	2,5943	KNOWN	1,597	1,030

TABLE - SLS49
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPES 19 & 20 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,5		120,5
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,5		120,5
4	9	0	0	0	20,0	21,793	14,060	KNOWN	139,8		119,8
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,3		99,3
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,7		125,7
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,2		119,2
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,5		118,5
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,6		103,6
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	128,1		93,1
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,8		120,8
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	134,0		119,0
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,2		115,2
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	132,2		117,2
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	126,4		96,4
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	125,8		85,8
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	129,0		119,0
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	130,1		115,1
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,8		122,8
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	129,6		114,6
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	129,3		119,3
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	129,3		119,3
29	65	66	63	71	15,0	0,000	0,000	KNOWN	129,5		114,5
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	131,7		121,7
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	133,0		123,0
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,5		125,5
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	129,8		109,8
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	130,0		110,0
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	129,5		119,5
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	129,9		119,9
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	130,4		115,4
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	131,0		116,0
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	131,0		116,0
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	131,5		111,5
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,5		99,5
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,7		117,7
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	129,1		119,1
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	128,7		113,7
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	128,7		113,7
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	128,8		108,8
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	128,2		68,2
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	127,8		102,8
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,3		115,3
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	128,4		58,4
51	38	37	36	0	60,0	0,000	0,000	KNOWN	128,4		68,4
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	122,6		112,6
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	115,3		95,3
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	128,4		108,4
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	128,8		118,8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48,0	2880,0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48,0	800,0	86,0	0,0012	KNOWN	2,385	1,539
6	2	6	48,0	4960,0	86,0	0,0072	KNOWN	19,305	12,455
7	2	12	48,0	1920,0	70,0	0,0041	KNOWN	22,466	14,494
8	3	5	30,0	1600,0	65,0	0,0386	KNOWN	6,372	4,111
9	4	5	48,0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16,0	1280,0	75,0	0,5056	KNOWN	0,455	0,294
10	5	14	48,0	2080,0	120,0	0,0016	KNOWN	25,990	16,768
1	7	6	16,0	11700,0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40,0	4160,0	67,0	0,0234	KNOWN	12,580	8,116
4	6	10	48,0	1920,0	86,0	0,0028	KNOWN	26,918	17,367
16	9	8	16,0	592,0	40,0	0,7482	KNOWN	0,458	0,295
47	8	18	40,0	3200,0	67,0	0,0180	KNOWN	8,729	5,631
5	10	9	48,0	2240,0	86,0	0,0033	KNOWN	23,413	15,105
15	9	11	16,0	4000,0	40,0	5,0552	KNOWN	0,353	0,228
46	9	49	48,0	3350,0	85,0	0,0050	KNOWN	18,058	11,650
14	10	11	24,0	2720,0	35,0	0,6109	KNOWN	1,822	1,176
13	12	11	16,0	5120,0	40,0	6,4706	KNOWN	0,721	0,465
28	16	11	24,0	1650,0	30,0	0,4929	KNOWN	0,529	0,341
11	12	13	48,0	1440,0	70,0	0,0031	KNOWN	18,976	12,242
12	14	13	48,0	960,0	120,0	0,0008	KNOWN	17,445	11,255
17	13	16	48,0	5120,0	120,0	0,0040	KNOWN	33,383	21,537
18	14	15	24,0	3680,0	65,0	0,2630	KNOWN	7,351	4,743
19	17	15	16,0	3840,0	0,0	99,9999	KNOWN	0,000	0,000
73	15	20	24,0	1040,0	66,0	0,0722	KNOWN	5,398	3,483
75	16	17	30,0	950,0	80,0	0,0156	KNOWN	13,073	8,434
26	16	32	48,0	1950,0	120,0	0,0015	KNOWN	17,564	11,332
74	17	19	30,0	1200,0	80,0	0,0197	KNOWN	11,523	7,434
45	18	41	48,0	4550,0	120,0	0,0036	KNOWN	18,263	11,782
49	18	42	16,0	5600,0	70,0	2,5133	KNOWN	0,999	0,645
48	49	18	48,0	640,0	85,0	0,0010	KNOWN	13,028	8,405
20	19	20	16,0	3200,0	0,0	99,9999	KNOWN	0,000	0,000
24	19	23	30,0	5600,0	135,0	0,0349	KNOWN	11,514	7,429
25	31	19	16,0	2000,0	60,0	1,1938	KNOWN	0,829	0,535
21	20	21	24,0	6720,0	135,0	0,1242	KNOWN	2,315	1,494
23	23	21	20,0	5120,0	135,0	0,2300	KNOWN	4,087	2,637
22	21	53	20,0	8470,0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20,0	1040,0	135,0	0,0467	KNOWN	8,609	5,554
29	32	22	48,0	1920,0	120,0	0,0015	KNOWN	12,632	8,150
44	49	22	48,0	3840,0	120,0	0,0030	KNOWN	0,209	0,135
33	23	46	30,0	4800,0	135,0	0,0299	KNOWN	2,524	1,628
34	23	54	20,0	1760,0	135,0	0,0791	KNOWN	2,826	1,823
43	25	24	16,0	2560,0	64,0	1,3561	KNOWN	1,452	0,937
65	24	29	16,0	3360,0	50,0	2,8102	KNOWN	0,438	0,283
64	24	33	36,0	2400,0	80,0	0,0162	KNOWN	5,070	3,271
52	40	24	30,0	4960,0	80,0	0,0814	KNOWN	4,568	2,947
76	25	30	20,0	800,0	135,0	0,0359	KNOWN	6,475	4,177
42	26	27	16,0	3200,0	135,0	0,4261	KNOWN	0,816	0,527
31	30	26	20,0	1600,0	135,0	0,0719	KNOWN	6,207	4,005
32	26	46	20,0	1760,0	135,0	0,0791	KNOWN	3,453	2,228
78	28	27	16,0	450,0	135,0	0,0599	KNOWN	0,328	0,211
77	27	43	16,0	1600,0	135,0	0,2131	KNOWN	0,803	0,518
66	29	28	30,0	2000,0	135,0	0,0125	KNOWN	4,749	3,064
67	28	43	30,0	1920,0	135,0	0,0120	KNOWN	3,910	2,522
63	33	29	30,0	800,0	65,0	0,0193	KNOWN	4,204	2,751
71	35	29	16,0	3200,0	80,0	1,1218	KNOWN	0,102	0,066
82	31	30	16,0	3900,0	70,0	1,7503	KNOWN	0,864	0,557
27	32	31	20,0	1600,0	50,0	0,4514	KNOWN	2,514	1,622
62	34	33	24,0	1920,0	65,0	0,1372	KNOWN	1,271	0,820
60	34	35	16,0	2800,0	80,0	0,9816	KNOWN	0,680	0,439
61	37	34	24,0	880,0	75,0	0,0483	KNOWN	3,289	2,109
59	36	35	16,0	2080,0	80,0	0,7292	KNOWN	0,684	0,441
58	37	36	16,0	2230,0	80,0	0,7818	KNOWN	0,829	0,535
57	39	36	16,0	2400,0	80,0	0,8414	KNOWN	1,172	0,756
56	38	37	30,0	1280,0	80,0	0,0210	KNOWN	5,989	3,864
55	38	39	30,0	560,0	80,0	0,0092	KNOWN	0,385	0,248
53	40	38	30,0	640,0	80,0	0,0105	KNOWN	7,691	4,962
54	42	39	16,0	960,0	70,0	0,4309	KNOWN	2,104	1,358
51	41	40	30,0	1280,0	80,0	0,0210	KNOWN	14,522	9,369
50	41	42	16,0	960,0	80,0	0,3365	KNOWN	2,423	1,563
68	43	55	30,0	1280,0	70,0	0,0269	KNOWN	4,201	2,710
41	45	44	30,0	2720,0	135,0	0,0170	KNOWN	1,115	0,719
69	55	44	30,0	1600,0	135,0	0,0100	KNOWN	1,892	1,220
40	46	45	30,0	1280,0	135,0	0,0080	KNOWN	2,560	1,652
39	45	47	16,0	2400,0	55,0	1,6828	KNOWN	0,515	0,332
38	46	51	20,0	1840,0	135,0	0,0826	KNOWN	2,409	1,554
72	47	48	20,0	5290,0	135,0	0,2376	KNOWN	1,335	0,861
37	51	47	20,0	800,0	135,0	0,0359	KNOWN	1,890	1,219
35	54	48	16,0	9100,0	135,0	1,2117	KNOWN	0,664	0,429
36	51	50	20,0	880,0	135,0	0,0395	KNOWN	0,528	0,335
79	54	50	20,0	1120,0	135,0	0,0503	KNOWN	1,077	0,695
70	55	52	16,0	3700,0	55,0	2,5943	KNOWN	1,597	1,030

TABLE - SLS50
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 27 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,6		120,6
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,6		120,6
4	9	0	0	0	20,0	21,793	14,060	KNOWN	139,9		119,9
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,4		99,4
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,2		126,2
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,4		126,4
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,6		125,6
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,6		118,6
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,7		103,7
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	131,6		96,6
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,7		120,7
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	133,1		118,1
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,2		115,2
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	130,9		115,9
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	129,8		99,8
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	127,8		87,8
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,3		125,3
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	128,6		118,6
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	129,9		114,9
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,4		122,4
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	129,1		114,1
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	128,9		118,9
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	129,0		119,0
29	65	66	63	71	15,0	0,000	0,000	KNOWN	129,2		114,2
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	131,0		121,0
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	130,8		120,8
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,5		125,5
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	129,5		109,5
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,8		109,8
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	129,2		119,2
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	129,6		119,6
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	130,2		115,2
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,8		115,8
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,8		115,8
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	131,3		111,3
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,4		99,4
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,6		117,6
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	128,8		118,8
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	128,4		113,4
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	128,4		113,4
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	128,4		108,4
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	127,9		67,9
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	127,5		102,5
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,3		115,3
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	128,0		58,0
51	38	37	36	0	60,0	0,000	0,000	KNOWN	128,0		68,0
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	122,2		112,2
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	117,3		97,3
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	128,1		108,1
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	128,4		118,4

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48,0	2880,0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48,0	800,0	86,0	0,0012	KNOWN	2,505	1,616
6	2	6	48,0	4960,0	86,0	0,0072	KNOWN	19,602	12,647
7	2	12	48,0	1920,0	70,0	0,0041	KNOWN	22,288	14,380
8	3	5	30,0	1600,0	65,0	0,0386	KNOWN	6,252	4,034
9	4	5	48,0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16,0	1280,0	75,0	0,5056	KNOWN	0,500	0,323
10	5	14	48,0	2080,0	120,0	0,0016	KNOWN	25,824	16,661
1	7	6	16,0	11700,0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40,0	4160,0	67,0	0,0234	KNOWN	12,674	8,176
4	6	10	48,0	1920,0	86,0	0,0028	KNOWN	27,125	17,500
16	9	8	16,0	592,0	40,0	0,7482	KNOWN	0,460	0,297
47	8	18	40,0	3200,0	67,0	0,0180	KNOWN	8,825	5,693
5	10	9	48,0	2240,0	86,0	0,0033	KNOWN	23,590	15,219
15	9	11	16,0	4000,0	40,0	5,0552	KNOWN	0,361	0,233
46	9	49	48,0	3350,0	85,0	0,0050	KNOWN	18,228	11,760
14	10	11	24,0	2720,0	35,0	0,6109	KNOWN	1,846	1,191
13	12	11	16,0	5120,0	40,0	6,4706	KNOWN	0,736	0,475
28	16	11	24,0	1650,0	30,0	0,4929	KNOWN	0,483	0,311
11	12	13	48,0	1440,0	70,0	0,0031	KNOWN	18,829	12,148
12	14	13	48,0	960,0	120,0	0,0008	KNOWN	18,695	12,061
17	13	16	48,0	5120,0	120,0	0,0040	KNOWN	34,487	22,250
18	14	15	24,0	3680,0	65,0	0,2630	KNOWN	5,937	3,830
19	17	15	16,0	3840,0	135,0	0,5113	KNOWN	1,776	1,146
73	15	20	24,0	1040,0	66,0	0,0722	KNOWN	5,759	3,716
75	16	17	30,0	950,0	80,0	0,0156	KNOWN	15,957	10,295
26	16	32	48,0	1950,0	120,0	0,0015	KNOWN	15,830	10,213
74	17	19	30,0	1200,0	80,0	0,0197	KNOWN	12,631	8,149
45	18	41	48,0	4550,0	120,0	0,0036	KNOWN	18,566	11,978
49	18	42	16,0	5600,0	70,0	2,5133	KNOWN	1,014	0,654
48	49	18	48,0	640,0	85,0	0,0010	KNOWN	13,251	8,549
20	19	20	16,0	3200,0	135,0	0,4261	KNOWN	1,726	1,114
24	19	23	30,0	5600,0	135,0	0,0349	KNOWN	9,620	6,206
25	19	31	16,0	2000,0	60,0	1,1938	KNOWN	0,296	0,191
21	20	21	24,0	6720,0	135,0	0,1242	KNOWN	4,448	2,869
23	23	21	20,0	5120,0	135,0	0,2300	KNOWN	2,000	1,291
22	21	53	20,0	8470,0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20,0	1040,0	135,0	0,0467	KNOWN	9,335	6,023
29	32	22	48,0	1920,0	120,0	0,0015	KNOWN	13,416	8,655
44	49	22	48,0	3840,0	120,0	0,0030	KNOWN	0,152	0,098
33	23	46	30,0	4800,0	135,0	0,0299	KNOWN	2,689	1,735
34	23	54	20,0	1760,0	135,0	0,0791	KNOWN	2,853	1,841
43	25	24	16,0	2560,0	64,0	1,3561	KNOWN	1,396	0,901
65	24	29	16,0	3360,0	50,0	2,8102	KNOWN	0,451	0,291
64	24	33	36,0	2400,0	80,0	0,0162	KNOWN	5,154	3,325
52	40	24	30,0	4960,0	80,0	0,0814	KNOWN	4,720	3,045
76	25	30	20,0	800,0	135,0	0,0359	KNOWN	7,257	4,682
42	26	27	16,0	3200,0	135,0	0,4261	KNOWN	0,619	0,399
31	30	26	20,0	1600,0	135,0	0,0719	KNOWN	5,753	3,712
32	26	46	20,0	1760,0	135,0	0,0791	KNOWN	3,197	2,062
78	28	27	16,0	450,0	135,0	0,0599	KNOWN	0,512	0,330
77	27	43	16,0	1600,0	135,0	0,2131	KNOWN	0,790	0,510
66	29	28	30,0	2000,0	135,0	0,0125	KNOWN	5,010	3,233
67	28	43	30,0	1920,0	135,0	0,0120	KNOWN	3,987	2,572
63	33	29	30,0	800,0	65,0	0,0193	KNOWN	4,435	2,862
71	35	29	16,0	3200,0	80,0	1,1218	KNOWN	0,124	0,080
82	30	31	16,0	3900,0	70,0	1,7503	KNOWN	0,259	0,167
27	32	31	20,0	1600,0	0,0	99,9999	KNOWN	0,001	0,000
62	34	33	24,0	1920,0	65,0	0,1372	KNOWN	1,358	0,876
60	34	35	16,0	2800,0	80,0	0,9816	KNOWN	0,711	0,459
61	37	34	24,0	880,0	75,0	0,0483	KNOWN	3,387	2,185
59	36	35	16,0	2080,0	80,0	0,7292	KNOWN	0,731	0,471
58	37	36	16,0	2230,0	80,0	0,7818	KNOWN	0,849	0,547
57	39	36	16,0	2400,0	80,0	0,8414	KNOWN	1,199	0,774
56	38	37	30,0	1280,0	80,0	0,0210	KNOWN	6,127	3,953
55	38	39	30,0	560,0	80,0	0,0092	KNOWN	0,365	0,235
53	40	38	30,0	640,0	80,0	0,0105	KNOWN	7,809	5,038
54	42	39	16,0	960,0	70,0	0,4309	KNOWN	2,152	1,388
51	41	40	30,0	1280,0	80,0	0,0210	KNOWN	14,792	9,543
50	41	42	16,0	960,0	80,0	0,3365	KNOWN	2,456	1,584
68	43	55	30,0	1280,0	70,0	0,0269	KNOWN	4,265	2,752
41	45	44	30,0	2720,0	135,0	0,0170	KNOWN	1,051	0,678
69	55	44	30,0	1600,0	135,0	0,0100	KNOWN	1,956	1,262
40	46	45	30,0	1280,0	135,0	0,0080	KNOWN	2,493	1,609
39	45	47	16,0	2400,0	55,0	1,6828	KNOWN	0,512	0,330
38	46	51	20,0	1840,0	135,0	0,0826	KNOWN	2,385	1,539
72	47	48	20,0	5290,0	135,0	0,2376	KNOWN	1,333	0,860
37	51	47	20,0	800,0	135,0	0,0359	KNOWN	1,891	1,220
35	54	48	16,0	9100,0	135,0	1,2117	KNOWN	0,666	0,430
36	51	50	20,0	880,0	135,0	0,0395	KNOWN	0,495	0,319
79	54	50	20,0	1120,0	135,0	0,0503	KNOWN	1,102	0,711
70	55	52	16,0	3700,0	55,0	2,5943	KNOWN	1,596	1,030

TABLE - SLS51
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 73 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,7		120,7
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,7		120,7
4	9	0	0	0	20,0	21,793	14,060	KNOWN	140,1		120,1
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,6		99,6
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,1		126,1
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,3		126,3
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,5		127,5
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,6		125,6
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,4		119,4
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,7		118,7
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	138,9		103,9
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	135,6		100,6
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,7		120,7
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	133,8		118,8
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,1		115,1
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	131,3		116,3
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	124,2		94,2
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	123,9		83,9
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,2		125,2
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	128,2		118,2
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	129,8		114,8
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	132,8		122,8
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	129,2		114,2
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	128,8		118,8
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	128,8		118,8
29	65	66	63	71	15,0	0,000	0,000	KNOWN	129,1		114,1
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	131,8		121,8
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	133,5		123,5
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,3		125,3
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	129,4		109,4
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,6		109,6
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	129,1		119,1
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	129,5		119,5
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	130,1		115,1
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,7		115,7
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,7		115,7
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	131,2		111,2
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,3		99,3
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,5		117,5
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	128,7		118,7
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	128,1		113,1
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	128,1		113,1
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	128,2		108,2
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	127,6		67,6
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	127,2		102,2
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,2		115,2
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	127,7		57,7
51	38	37	36	0	60,0	0,000	0,000	KNOWN	127,7		67,7
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	122,0		112,0
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	113,4		93,4
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	127,7		107,7
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	128,2		118,2

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48.0	800.0	86,0	0,0012	KNOWN	2,744	1.770
6	2	6	48.0	4960.0	86,0	0,0072	KNOWN	20,241	13,059
7	2	12	48.0	1920.0	70,0	0,0041	KNOWN	21,889	14,122
8	3	5	30.0	1600.0	65,0	0,0386	KNOWN	6,013	3,880
9	4	5	48,0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,571	0,369
10	5	14	48.0	2080.0	120,0	0,0016	KNOWN	25,515	16,461
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40.0	4160.0	67,0	0,0234	KNOWN	12,879	8,309
4	6	10	48.0	1920.0	86,0	0,0028	KNOWN	27,558	17,780
16	9	8	16.0	592.0	40,0	0,7482	KNOWN	0,462	0,298
47	8	18	40.0	3200.0	67,0	0,0180	KNOWN	9,032	5,827
5	10	9	48.0	2240.0	86,0	0,0033	KNOWN	24,026	15,501
15	9	11	16.0	4000.0	40,0	5.0552	KNOWN	0,349	0,225
46	9	49	48.0	3350.0	85,0	0,0050	KNOWN	18,674	12.048
14	10	11	24.0	2720.0	35,0	0,6109	KNOWN	1,843	1,189
13	12	11	16.0	5120.0	40,0	6,4706	KNOWN	0,755	0,487
28	16	11	24.0	1650.0	30,0	0.4929	KNOWN	0,478	0.309
11	12	13	48.0	1440.0	70,0	0,0031	KNOWN	18,481	11,923
12	14	13	48.0	960.0	120,0	0,0008	KNOWN	20,395	13,158
17	13	16	48.0	5120.0	120,0	0,0040	KNOWN	35,838	23.121
18	14	15	24.0	3680.0	65,0	0.2630	KNOWN	3,925	2,532
19	15	17	16.0	3840.0	135,0	0,5113	KNOWN	1,970	1.271
73	15	20	24.0	1040.0	0,0	99,9999	KNOWN	0,002	0.002
75	16	17	30.0	950,0	80,0	0,0156	KNOWN	13,223	8,531
26	16	32	48.0	1950.0	120,0	0,0015	KNOWN	19,919	12,851
74	17	19	30,0	1200.0	80,0	0,0197	KNOWN	13,644	8,803
45	18	41	48,0	4550.0	120,0	0.0036	KNOWN	18,533	11,956
49	18	42	16.0	5600.0	70,0	2.5133	KNOWN	1,012	0,653
48	49	18	48.0	640.0	85,0	0,0010	KNOWN	13,009	8.393
20	19	20	16.0	3200.0	135,0	0,4261	KNOWN	4,592	2,963
24	19	23	30.0	5600.0	135,0	0,0349	KNOWN	11,274	7.274
25	31	19	16.0	2000.0	135,0	0,2663	KNOWN	3,059	1.973
21	20	21	24.0	6720.0	135,0	0.1242	KNOWN	1,545	0,997
23	23	21	20,0	5120.0	135,0	0,2300	KNOWN	4,890	3.155
22	21	53	20.0	8470.0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20.0	1040.0	135,0	0,0467	KNOWN	8,340	5,380
29	32	22	48,0	1920,0	120,0	0,0015	KNOWN	11,726	7,565
44	49	22	48.0	3840.0	120,0	0,0030	KNOWN	0,844	0,544
33	23	46	30.0	4800.0	135,0	0.0299	KNOWN	1,606	1,036
34	23	54	20,0	1760,0	135,0	0,0791	KNOWN	2,699	1,742
43	25	24	16.0	2560.0	64,0	1,3561	KNOWN	1,543	0,996
65	24	29	16.0	3360.0	50,0	2,8102	KNOWN	0,460	0,297
64	24	33	36,0	2400.0	80,0	0,0162	KNOWN	5,260	3,393
52	40	24	30.0	4960.0	80,0	0,0814	KNOWN	4,688	3,024
76	25	30	20.0	800.0	135,0	0,0359	KNOWN	6,114	3,945
42	26	27	16,0	3200,0	135,0	0,4261	KNOWN	0,935	0,603
31	30	26	20.0	1600.0	135,0	0,0719	KNOWN	6,878	4.437
32	26	46	20.0	1760.0	135,0	0,0791	KNOWN	4,005	2,584
78	28	27	16.0	450.0	135,0	0,0599	KNOWN	0,299	0,193
77	27	43	16.0	1600.0	135,0	0,2131	KNOWN	0,893	0.576
66	29	28	30.0	2000.0	135,0	0,0125	KNOWN	5,123	3.305
67	28	43	30,0	1920,0	135,0	0,0120	KNOWN	4,312	2,782
63	33	29	30.0	800.0	65,0	0,0193	KNOWN	4,530	2,923
71	35	29	16.0	3200.0	80,0	1,1218	KNOWN	0,128	0,083
82	31	30	16,0	3900,0	135,0	0,5193	KNOWN	1,895	1,222
27	32	31	20.0	1600.0	135,0	0,0719	KNOWN	5,775	3,726
62	34	33	24.0	1920.0	65,0	0.1372	KNOWN	1,347	0,869
60	34	35	16,0	2800,0	80,0	0,9816	KNOWN	0,717	0,462
61	37	34	24.0	880.0	75,0	0,0483	KNOWN	3,382	2,182
59	36	35	16.0	2080.0	80,0	0,7292	KNOWN	0,734	0.473
58	37	36	16,0	2230.0	80,0	0,7818	KNOWN	0,851	0,549
57	39	36	16.0	2400.0	80,0	0,8414	KNOWN	1,201	0,775
56	38	37	30.0	1280.0	80,0	0,0210	KNOWN	6,123	3,950
55	38	39	30,0	560,0	80,0	0,0092	KNOWN	0,371	0,239
53	40	38	30.0	640.0	80,0	0,0105	KNOWN	7,811	5.039
54	42	39	16.0	960.0	70,0	0.4309	KNOWN	2,148	1,385
51	41	40	30,0	1280.0	80,0	0,0210	KNOWN	14,762	9,524
50	41	42	16.0	960.0	80,0	0,3365	KNOWN	2,453	1,583
68	43	55	30.0	1280.0	70,0	0,0269	KNOWN	4,694	3,028
41	45	44	30,0	2720,0	135,0	0,0170	KNOWN	0,622	0,401
69	55	44	30.0	1600.0	135,0	0,0100	KNOWN	2,385	1,538
40	46	45	30.0	1280.0	135,0	0,0080	KNOWN	2,093	1,350
39	45	47	16.0	2400.0	55,0	1,6828	KNOWN	0,540	0,349
38	46	51	20.0	1840.0	135,0	0,0826	KNOWN	2,511	1,620
72	47	48	20.0	5290.0	135,0	0,2376	KNOWN	1,344	0,867
37	51	47	20,0	800,0	135,0	0,0359	KNOWN	1,873	1,208
35	54	48	16.0	9100.0	135,0	1,2117	KNOWN	0,656	0,423
36	51	50	20.0	880.0	135,0	0.0395	KNOWN	0,638	0.412
79	54	50	20.0	1120,0	135,0	0,0503	KNOWN	0,959	0,618
70	55	52	16.0	3700.0	55,0	2,5943	KNOWN	1,597	1.030

TABLE - SLS52
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 18 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20.0	39,385	25,410	KNOWN	140,8		120,8
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,9		120,9
4	9	0	0	0	20,0	21,793	14,060	KNOWN	140,4		120,4
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,9		99,9
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,0		126,0
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,2		126,2
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,4		127,4
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	135,4		125,4
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,7		119,7
13	11	12	17	0	20.0	-3,038	-1,960	KNOWN	139,0		119,0
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	139,3		104,3
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	108,4		73,4
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	135,5		120,5
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	132,4		117,4
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	134,8		114,8
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	130,4		115,4
20	73	20	21	0	30.0	-3,038	-1,960	KNOWN	108,4		78,4
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	105,9		65,9
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,0		125,0
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	119,1		109,1
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	126,4		111,4
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	128,5		118,5
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	122,1		107,1
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	122,1		112,1
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	122,6		112,6
29	65	66	63	71	15,0	0,000	0,000	KNOWN	125,0		110,0
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	126,1		116,1
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	131,0		121,0
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,2		125,2
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	125,8		105,8
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	126,6		106,6
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	125,8		115,8
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	126,8		116,8
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	127,6		112,6
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	128,5		113,5
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	128,5		113,5
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	129,1		109,1
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	133,7		98,7
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	131,3		116,3
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	121,2		111,2
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	119,4		104,4
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	119,1		104,1
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	119,1		99,1
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	117,0		57,0
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	114,7		89,7
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,0		115,0
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	117,3		47,3
51	38	37	36	0	60,0	0,000	0,000	KNOWN	117,3		57,3
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	113,9		103,9
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	95,4		75,4
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	117,3		97,3
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	120,1		110,1

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48.0	800.0	86,0	0.0012	KNOWN	3,171	2,046
6	2	6	48.0	4960.0	86,0	0,0072	KNOWN	21,274	13,725
7	2	12	48.0	1920.0	70,0	0,0041	KNOWN	21,282	13,730
8	3	5	30.0	1600.0	65,0	0,0386	KNOWN	5,587	3,604
9	4	5	48.0	2000.0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,691	0,446
10	5	14	48.0	2080.0	120,0	0,0016	KNOWN	24,968	16,109
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40.0	4160.0	67,0	0,0234	KNOWN	13,259	8,554
4	6	10	48.0	1920.0	86,0	0,0028	KNOWN	28,212	18,201
16	9	8	16.0	592.0	40,0	0,7482	KNOWN	0,506	0,326
47	8	18	40.0	3200.0	67,0	0,0180	KNOWN	9,455	6.100
5	10	9	48.0	2240.0	86,0	0,0033	KNOWN	24,637	15,895
15	9	11	16.0	4000.0	40,0	5,0552	KNOWN	0,356	0,230
46	9	49	48.0	3350.0	85,0	0,0050	KNOWN	19,233	12,408
14	10	11	24.0	2720.0	35,0	0,6109	KNOWN	1,886	1,217
13	12	11	16.0	5120.0	40,0	6,4706	KNOWN	0,795	0,513
28	16	11	24.0	1650.0	30,0	0,4929	KNOWN	0,388	0,250
11	12	13	48.0	1440.0	70,0	0,0031	KNOWN	17,953	11,583
12	14	13	48.0	960.0	120,0	0,0008	KNOWN	23,773	15,337
17	13	16	48.0	5120.0	120,0	0,0040	KNOWN	38,688	24,960
18	14	15	24.0	3680.0	0,0	99,9999	KNOWN	0,002	0,001
19	17	15	16.0	3840.0	63,0	2,0943	KNOWN	3,729	2,406
73	15	20	24.0	1040.0	135,0	0,0192	KNOWN	1,597	1,031
75	16	17	30.0	950.0	80,0	0,0156	KNOWN	17,499	11.290
26	16	32	48.0	1950.0	120,0	0,0015	KNOWN	18,585	11,990
74	17	19	30.0	1200.0	80,0	0,0197	KNOWN	12,222	7,885
45	18	41	48.0	4550.0	120,0	0,0036	KNOWN	22,399	14,451
49	18	42	16.0	5600.0	70,0	2,5133	KNOWN	1,196	0,772
48	49	18	48.0	640.0	85,0	0,0010	KNOWN	16,635	10,732
20	19	20	16.0	3200.0	60,0	1,9101	KNOWN	3,740	2,413
24	19	23	30.0	5600.0	50,0	0,2193	KNOWN	8,383	5,408
25	31	19	16.0	2000.0	60,0	1,1938	KNOWN	0,739	0,477
21	20	21	24.0	6720.0	66,0	0,4668	KNOWN	2,480	1,600
23	23	21	20.0	5120.0	60,0	1,0309	KNOWN	3,968	2,560
22	21	53	20.0	8470.0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20.0	1040.0	60,0	0,2094	KNOWN	6,407	4,134
29	32	22	48.0	1920.0	120,0	0,0015	KNOWN	12,862	8,298
44	22	49	48.0	3840.0	120,0	0,0030	KNOWN	2,223	1,434
33	23	46	30.0	4800.0	80,0	0,0788	KNOWN	0,125	0,081
34	23	54	20.0	1760.0	55,0	0,4163	KNOWN	2,186	1,410
43	25	24	16.0	2560.0	64,0	1,3561	KNOWN	1,271	0,820
65	24	29	16.0	3360.0	50,0	2,8102	KNOWN	0,675	0,435
64	24	33	36.0	2400.0	80,0	0,0162	KNOWN	6,828	4,405
52	40	24	30.0	4960.0	80,0	0,0814	KNOWN	6,744	4,351
76	25	30	20.0	800.0	63,0	0,1472	KNOWN	4,455	2,874
42	27	26	16.0	3200.0	60,0	1,9101	KNOWN	0,048	0,031
31	30	26	20.0	1600.0	78,0	0,1983	KNOWN	5,068	3,270
32	26	46	20.0	1760.0	60,0	0.3544	KNOWN	3,178	2,050
78	28	27	16.0	450.0	70,0	0,2020	KNOWN	1,558	1,005
77	27	43	16.0	1600.0	70,0	0,7181	KNOWN	1,167	0,753
66	29	28	30.0	2000.0	70,0	0.0420	KNOWN	8,903	5,744
67	28	43	30.0	1920.0	70,0	0,0403	KNOWN	6,827	4,405
63	33	29	30.0	800.0	65,0	0.0193	KNOWN	7,413	4,783
71	35	29	16.0	3200.0	80,0	1.1218	KNOWN	0,807	0,521
82	31	30	16.0	3900.0	70,0	1,7503	KNOWN	1,745	1,126
27	32	31	20.0	1600.0	50,0	0,4514	KNOWN	3,305	2,133
62	34	33	24.0	1920.0	65,0	0,1372	KNOWN	2,668	1,721
60	34	35	16.0	2800.0	80,0	0,9816	KNOWN	0,941	0,607
61	37	34	24.0	880.0	75,0	0.0483	KNOWN	4,926	3.178
59	36	35	16.0	2080.0	80,0	0,7292	KNOWN	1,185	0,764
58	37	36	16.0	2230.0	80,0	0,7818	KNOWN	1,015	0,655
57	39	36	16.0	2400.0	80,0	0,8414	KNOWN	1,487	0,959
56	38	37	30.0	1280.0	80,0	0.0210	KNOWN	7,832	5.053
55	38	39	30.0	560.0	80,0	0.0092	KNOWN	0,055	0,036
53	40	38	30.0	640.0	80,0	0,0105	KNOWN	9,204	5.938
54	42	39	16.0	960.0	70,0	0.4309	KNOWN	2,749	1,773
51	41	40	30.0	1280.0	80,0	0,0210	KNOWN	18,211	11,749
50	41	42	16.0	960.0	80,0	0,3365	KNOWN	2,870	1,852
68	43	55	30.0	1280.0	70,0	0,0269	KNOWN	7,488	4,831
41	44	45	30.0	2720.0	70,0	0,0572	KNOWN	2,171	1,401
69	55	44	30.0	1600.0	70,0	0.0336	KNOWN	5,178	3,341
40	45	46	30.0	1280.0	80,0	0,0210	KNOWN	0,118	0,076
39	45	47	16.0	2400.0	55,0	1,6828	KNOWN	1,124	0,725
38	46	51	20.0	1840.0	63,0	0,3385	KNOWN	2,441	1,575
72	47	48	20.0	5290.0	55,0	1,2512	KNOWN	1,383	0,893
37	51	47	20.0	800.0	55,0	0,1892	KNOWN	1,329	0,858
35	54	48	16.0	9100.0	55,0	6,3805	KNOWN	0,616	0,397
36	51	50	20.0	880.0	110,0	0,0577	KNOWN	1,123	0,725
79	54	50	20.0	1120.0	55,0	0,2649	KNOWN	0,485	0,313
70	55	52	16.0	3700.0	55,0	2,5943	KNOWN	1,596	1.030

TABLE - SLS53
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 64 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVENT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	140.4		120.4
3	81	8	0	0	20.0	8.758	5.650	KNOWN	140.4		120.4
4	9	0	0	0	20.0	21.793	14.060	KNOWN	139.6		119.6
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139.2		99.2
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	136.3		126.3
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	136.5		126.5
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	137.6		127.6
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	135.8		125.8
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139.1		119.1
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	138.3		118.3
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	138.5		103.5
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	133.9		98.9
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	135.9		120.9
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	134.5		119.5
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	135.3		115.3
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	133.3		118.3
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	133.0		103.0
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	122.0		82.0
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	135.5		125.5
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	122.9		112.9
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	130.4		115.4
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	130.6		120.6
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	124.4		109.4
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	123.9		113.9
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	124.1		114.1
29	65	66	63	71	15.0	0.000	0.000	KNOWN	125.3		110.3
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	128.3		118.3
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	133.3		123.3
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	135.6		125.6
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	125.6		105.6
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	126.7		106.7
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	126.0		116.0
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	127.0		117.0
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	127.5		112.5
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	129.3		114.3
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	129.3		114.3
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	130.5		110.5
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	134.3		99.3
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	132.0		117.0
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	123.3		113.3
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	122.4		107.4
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	122.4		107.4
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	122.4		102.4
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	120.5		60.5
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	118.2		93.2
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	135.4		115.4
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	120.8		50.8
51	38	37	36	0	60.0	0.000	0.000	KNOWN	120.8		60.8
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	116.5		106.5
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	111.5		91.5
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	120.9		100.9
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	122.7		112.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.192	1.414
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	18.801	12.130
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	22.776	14.694
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.566	4.236
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.376	0.242
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	26.262	16.944
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.465	8.042
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	26.532	17.118
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.488	0.315
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.644	5.577
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	23.050	14.871
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.347	0.224
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	17.674	11.402
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.793	1.157
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.698	0.451
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.588	0.379
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	19.230	12.406
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	15.427	9.953
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	31.618	20.399
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	9.644	6.222
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.499	0.322
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	8.189	5.283
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	11.395	7.352
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	17.421	11.239
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	9.346	6.030
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	20.704	13.357
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.158	0.747
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	15.713	10.137
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	0.359	0.232
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	8.027	5.179
25	19	31	16.0	2000.0	60.0	1.1938	KNOWN	0.122	0.079
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	5.510	3.555
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	0.938	0.605
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.116	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.465	3.526
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	12.556	8.101
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	2.860	1.845
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.644	1.706
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.356	1.520
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	0.407	0.263
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	1.368	0.883
64	24	33	36.0	2400.0	0.0	99.9999	KNOWN	0.003	0.002
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	1.468	0.947
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	4.375	2.823
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.495	0.319
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.992	3.220
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.557	1.649
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.800	0.516
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.954	0.615
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	6.291	4.059
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	4.990	3.219
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	4.203	2.712
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.733	0.473
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.748	1.128
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.447	1.579
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	6.278	4.050
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.839	0.541
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	8.434	5.441
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.212	0.782
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.796	0.514
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.733	1.118
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	11.121	7.175
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.376	0.242
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	12.815	8.267
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.675	1.726
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	16.552	10.678
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.835	1.829
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	5.432	3.505
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.401	0.259
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.123	2.015
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.875	1.210
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.066	0.688
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.329	1.502
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.375	0.887
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.379	0.889
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.624	0.402
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.990	0.639
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.647	0.417
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE - SLS54
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 52 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVENT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	140.4		120.4
3	81	8	0	0	20.0	8.758	5.650	KNOWN	140.4		120.4
4	9	0	0	0	20.0	21.793	14.060	KNOWN	139.6		119.6
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139.2		99.2
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	136.3		126.3
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	136.5		126.5
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	137.6		127.6
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	135.7		125.7
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139.1		119.1
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	138.3		118.3
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	138.5		103.5
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	133.9		98.9
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	135.9		120.9
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	134.5		119.5
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	135.3		115.3
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	133.2		118.2
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	132.9		102.9
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	121.8		81.8
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	135.5		125.5
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	122.7		112.7
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	125.7		110.7
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	129.2		119.2
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	124.0		109.0
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	123.7		113.7
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	123.9		113.9
29	65	66	63	71	15.0	0.000	0.000	KNOWN	125.3		110.3
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	127.4		117.4
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	133.1		123.1
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	135.6		125.6
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	125.7		105.7
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	126.9		106.9
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	126.1		116.1
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	127.3		117.3
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	127.8		112.8
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	129.7		114.7
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	129.7		114.7
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	131.0		111.0
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	134.4		99.4
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	132.2		117.2
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	123.1		113.1
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	122.1		107.1
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	122.1		107.1
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	122.2		102.2
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	120.2		60.2
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	118.0		93.0
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	135.5		115.5
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	120.5		50.5
51	38	37	36	0	60.0	0.000	0.000	KNOWN	120.6		60.6
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	116.3		106.3
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	111.3		91.3
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	120.7		100.7
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	122.4		112.4

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.177	1.405
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	18.753	12.098
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	22.810	14.716
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.580	4.245
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.372	0.240
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	26.281	16.955
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.432	8.021
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	26.517	17.108
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.476	0.307
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.599	5.548
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	23.029	14.858
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.350	0.226
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	17.662	11.395
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.798	1.160
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.698	0.450
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.579	0.373
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	19.260	12.426
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	15.405	9.939
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	31.627	20.404
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	9.683	6.247
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.500	0.323
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	8.230	5.310
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	11.526	7.436
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	17.306	11.165
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	9.475	6.113
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	19.720	12.722
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.122	0.724
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	14.739	9.509
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	0.345	0.223
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	8.080	5.213
25	19	31	16.0	2000.0	60.0	1.1938	KNOWN	0.213	0.138
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	5.537	3.572
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	0.911	0.588
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.116	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	6.251	4.033
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	12.380	7.987
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	1.898	1.224
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.729	1.760
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.364	1.525
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	1.677	1.082
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.363	0.234
64	24	33	36.0	2400.0	135.0	0.0062	KNOWN	0.522	0.337
52	40	24	30.0	4960.0	0.0	99.9999	KNOWN	0.001	0.001
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.893	2.512
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	0.339	0.218
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.661	3.007
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.385	1.539
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	0.944	0.609
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.941	0.607
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	6.553	4.228
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.098	3.289
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	5.341	3.446
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	0.848	0.547
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.899	1.225
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	2.508	1.618
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	6.615	4.268
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	0.881	0.568
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	8.816	5.688
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.285	0.829
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.813	0.524
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.789	1.154
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	11.519	7.431
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.533	0.344
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	13.369	8.625
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.574	1.660
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	15.634	10.086
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.769	1.786
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	5.528	3.566
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.211	0.136
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.218	2.076
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.784	1.151
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.065	0.687
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.322	1.498
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.375	0.887
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.379	0.890
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.625	0.403
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.943	0.608
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.654	0.422
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE - SLS55
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 63 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	140.4		120.4
3	81	8	0	0	20.0	8,758	5.650	KNOWN	140,4		120,4
4	9	0	0	0	20.0	21.793	14.060	KNOWN	139,6		119,6
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139,2		99.2
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138,8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143,8		98,8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	136,3		126.3
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	136,5		126,5
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	137,6		127,6
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	135,7		125,7
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139,1		119,1
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	138,3		118,3
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	138,5		103.5
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	133,9		98,9
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	135,9		120,9
17	19	75	74	0	15.0	-1,550	-1,000	KNOWN	134,5		119,5
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	135,3		115,3
19	74	20	24	25	15,0	-0.837	-0,540	KNOWN	133,2		118,2
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	132,9		102.9
21	21	23	22	0	40,0	-3.333	-2.150	KNOWN	121,8		81,8
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	135,5		125,5
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	122,6		112,6
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	129,7		114,7
25	30	43	76	0	10.0	-0.682	-0,440	KNOWN	130,0		120,0
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	124,0		109,0
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	123,5		113,5
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	123,6		113,6
29	65	66	63	71	15,0	0,000	0,000	KNOWN	124,9		109,9
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	127,8		117,8
31	25	82	27	0	10.0	-0,821	-0.530	KNOWN	133,2		123,2
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,6		125.6
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	129,6		109,6
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,6		109,6
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	127,4		117,4
36	59	58	57	0	10,0	-1.318	-0,850	KNOWN	128,6		118,6
37	61	58	56	0	15,0	-1.891	-1.220	KNOWN	129,7		114,7
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,3		115,3
39	57	55	54	0	15,0	-1.318	-0.850	KNOWN	130,3		115,3
40	52	53	51	0	20,0	-2.263	-1,460	KNOWN	130,7		110,7
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,4		99,4
42	49	54	50	0	15.0	-1.318	-0,850	KNOWN	132,4		117,4
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	122,9		112,9
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	122,0		107,0
45	41	40	39	0	15,0	-0.930	-0.600	KNOWN	122,0		107,0
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	122,1		102,1
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	120,1		60,1
48	72	35	0	0	25,0	-1.999	-1.290	KNOWN	117,9		92,9
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	135,5		115,5
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	120,4		50,4
51	38	37	36	0	60,0	0.000	0.000	KNOWN	120,5		60,5
52	70	0	0	0	10,0	-1,596	-1.030	KNOWN	116,1		106,1
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	111,3		91,3
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	120,6		100,6
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	122,3		112,3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67,0	0.0067	KNOWN	28,241	18.220
81	3	2	48.0	800.0	86,0	0,0012	KNOWN	2,180	1,406
6	2	6	48.0	4960.0	86,0	0.0072	KNOWN	18,761	12.104
7	2	12	48.0	1920.0	70,0	0,0041	KNOWN	22,804	14,712
8	3	5	30.0	1600,0	65,0	0,0386	KNOWN	6,578	4,244
9	4	5	48.0	2000.0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,372	0.240
10	5	14	48,0	2080.0	120,0	0.0016	KNOWN	26,278	16,954
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0.450
3	6	8	40.0	4160.0	67,0	0,0234	KNOWN	12,442	8.027
4	6	10	48,0	1920,0	86,0	0.0028	KNOWN	26,516	17.107
16	9	8	16.0	592.0	40,0	0,7482	KNOWN	0,481	0.310
47	8	18	40.0	3200.0	67,0	0.0180	KNOWN	8,613	5.557
5	10	9	48.0	2240.0	86,0	0.0033	KNOWN	23,030	14,858
15	9	11	16.0	4000.0	40,0	5.0552	KNOWN	0,350	0.225
46	9	49	48.0	3350.0	85,0	0.0050	KNOWN	17,657	11.392
14	10	11	24.0	2720.0	35,0	0,6109	KNOWN	1,797	1.159
13	12	11	16.0	5120.0	40,0	6,4706	KNOWN	0,698	0,450
28	16	11	24.0	1650.0	30,0	0.4929	KNOWN	0.581	0,375
11	12	13	48.0	1440.0	70,0	0,0031	KNOWN	19,254	12,422
12	14	13	48.0	960.0	120,0	0.0008	KNOWN	15,396	9.933
17	13	16	48.0	5120.0	120.0	0,0040	KNOWN	31,613	20,395
18	14	15	24,0	3680.0	135,0	0,0680	KNOWN	9,688	6,250
19	17	15	16.0	3840.0	63,0	2,0943	KNOWN	0,504	0,325
73	15	20	24.0	1040.0	135,0	0.0192	KNOWN	8,238	5,315
75	16	17	30,0	950.0	80,0	0.0156	KNOWN	11,524	7,435
26	16	32	48.0	1950.0	120,0	0.0015	KNOWN	17,289	11.154
74	17	19	30.0	1200.0	80,0	0,0197	KNOWN	9,467	6.108
45	18	41	48,0	4550,0	120,0	0,0036	KNOWN	20,196	13,030
49	18	42	16.0	5600.0	70,0	2,5133	KNOWN	1,084	0,699
48	49	18	48.0	640.0	85,0	0,0010	KNOWN	15,146	9,772
20	19	20	16.0	3200.0	60,0	1,9101	KNOWN	0,353	0,228
24	19	23	30.0	5600.0	50,0	0,2193	KNOWN	8,123	5,240
25	19	31	16.0	2000.0	60,0	1,1938	KNOWN	0,157	0.101
21	20	21	24,0	6720.0	66,0	0,4668	KNOWN	5,554	3,583
23	23	21	20.0	5120.0	60,0	1,0309	KNOWN	0,894	0,577
22	21	53	20.0	8470.0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20.0	1040.0	60,0	0,2094	KNOWN	5,830	3,761
29	32	22	48.0	1920.0	120,0	0,0015	KNOWN	12,387	7,992
44	22	49	48.0	3840.0	120,0	0.0030	KNOWN	2,305	1,487
33	23	46	30,0	4800.0	80,0	0,0788	KNOWN	2,781	1,794
34	23	54	20.0	1760.0	55,0	0,4163	KNOWN	2,371	1,529
43	25	24	16.0	2560.0	135,0	0,3409	KNOWN	0,905	0,584
65	24	29	16.0	3360.0	135,0	0,4474	KNOWN	3,607	2,327
64	24	33	36.0	2400.0	135,0	0.0062	KNOWN	3,287	2.121
52	40	24	30.0	4960.0	135,0	0.0309	KNOWN	6,501	4.194
76	25	30	20,0	800,0	63,0	0,1472	KNOWN	4,243	2,738
42	26	27	16.0	3200.0	60,0	1,9101	KNOWN	0,492	0,318
31	30	26	20.0	1600.0	78,0	0,1983	KNOWN	4,937	3,185
32	26	46	20.0	1760.0	60,0	0,3544	KNOWN	2,508	1,618
78	28	27	16.0	450.0	70,0	0,2020	KNOWN	0,789	0,509
77	27	43	16.0	1600.0	70,0	0,7181	KNOWN	0,940	0,607
66	29	28	30.0	2000.0	70,0	0.0420	KNOWN	6,221	4.013
67	28	43	30.0	1920.0	70,0	0.0403	KNOWN	4,918	3,173
63	33	29	30.0	800.0	0.0	99.9999	KNOWN	0,003	0.002
71	35	29	16.0	3200.0	135,0	0,4261	KNOWN	2,607	1,682
82	31	30	16.0	3900.0	70,0	1.7503	KNOWN	1,825	1,178
27	32	31	20.0	1600.0	50,0	0.4514	KNOWN	2,490	1.607
62	33	34	24.0	1920.0	135,0	0.0355	KNOWN	1,108	0,715
60	34	35	16.0	2800.0	135,0	0.3728	KNOWN	2,609	1.683
61	37	34	24.0	880.0	135,0	0,0163	KNOWN	2,719	1.754
59	36	35	16,0	2080.0	80,0	0,7292	KNOWN	1,315	0,849
58	37	36	16.0	2230.0	80,0	0,7818	KNOWN	1,199	0.774
57	39	36	16.0	2400.0	80,0	0,8414	KNOWN	1,434	0.925
56	38	37	30.0	1280.0	80,0	0.0210	KNOWN	5,810	3,748
55	38	39	30.0	560.0	80,0	0.0092	KNOWN	0,378	0,244
53	40	38	30.0	640.0	80,0	0,0105	KNOWN	7,505	4,842
54	42	39	16.0	960.0	70,0	0,4309	KNOWN	2,373	1,531
51	41	40	30.0	1280.0	80,0	0,0210	KNOWN	16,269	10.496
50	41	42	16.0	960.0	80,0	0,3365	KNOWN	2,607	1,682
68	43	55	30.0	1280.0	70,0	0,0269	KNOWN	5,347	3,449
41	44	45	30.0	2720.0	70,0	0,0572	KNOWN	0,179	0.115
69	55	44	30.0	1600.0	70,0	0.0336	KNOWN	3,023	1,951
40	46	45	30.0	1280.0	80,0	0,0210	KNOWN	1,946	1,256
39	45	47	16.0	2400.0	55,0	1,6828	KNOWN	1,062	0,685
38	46	51	20.0	1840.0	63,0	0.3385	KNOWN	2,319	1,496
72	47	48	20.0	5290.0	55,0	1,2512	KNOWN	1,375	0,887
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1,383	0,892
35	54	48	16.0	9100.0	55,0	6,3805	KNOWN	0,625	0,403
36	51	50	20,0	880,0	110,0	0.0577	KNOWN	0,936	0,604
79	54	50	20.0	1120.0	55,0	0,2649	KNOWN	0,661	0.426
70	55	52	16.0	3700.0	55,0	2.5943	KNOWN	1,597	1.030

TABLE - SLS56
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 74 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,4		120.4
3	81	8	0	0	20.0	8,758	5,650	KNOWN	140,4		120,4
4	9	0	0	0	20.0	21.793	14.060	KNOWN	139,7		119,7
5	8	9	80	10	40.0	-1,720	-1,110	KNOWN	139,2		99.2
6	2	6	1	3	10.0	-8.742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45.0	0.697	0,450	KNOWN	143.8		98,8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	136,2		126.2
9	16	5	15	46	10.0	-4,541	-2,930	KNOWN	136,5		126,5
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,6		127,6
11	15	14	13	28	10.0	-3,426	-2,210	KNOWN	136,0		126.0
12	7	80	13	11	20.0	-3,224	-2,080	KNOWN	139,1		119,1
13	11	12	17	0	20.0	-3,038	-1.960	KNOWN	138,4		118,4
14	10	12	18	0	35.0	-1,193	-0.770	KNOWN	138,5		103.5
15	18	19	73	0	35,0	-1.953	-1,260	KNOWN	132,1		97,1
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	136,3		121,3
17	19	75	74	0	15.0	-1,550	-1,000	KNOWN	136,2		121.2
18	47	45	49	48	20.0	-2,495	-1,610	KNOWN	135.2		115,2
19	74	20	24	25	15.0	-0,837	-0.540	KNOWN	121,6		106,6
20	73	20	21	0	30.0	-3,038	-1,960	KNOWN	130,4		100.4
21	21	23	22	0	40,0	-3,333	-2.150	KNOWN	118,3		78,3
22	30	29	44	0	10.0	-4,231	-2,730	KNOWN	135,5		125,5
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	118,8		108,8
24	43	65	64	52	15,0	-0.511	-0.330	KNOWN	127,3		112,3
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	128,1		118,1
26	42	31	32	0	15.0	-1,938	-1,250	KNOWN	122,1		107,1
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	122,7		112,7
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	123,5		113,5
29	65	66	63	71	15,0	0,000	0.000	KNOWN	126.7		111,7
30	76	31	82	0	10.0	-1,131	-0.730	KNOWN	125,6		115,6
31	25	82	27	0	10,0	-0,821	-0.530	KNOWN	128,2		118,2
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,8		125,8
33	64	63	62	0	20,0	-2,077	-1.340	KNOWN	127,0		107,0
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	127,2		107,2
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	126,8		116,8
36	59	58	57	0	10.0	-1.318	-0,850	KNOWN	127,1		117,1
37	61	58	56	0	15,0	-1.891	-1.220	KNOWN	127,5		112,5
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	128,4		113,4
39	57	55	54	0	15,0	-1.318	-0,850	KNOWN	128,4		113,4
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	128,9		108,9
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,0		99,0
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	131,5		116,5
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	121,7		111,7
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	119,4		104,4
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	118,9		103,9
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	118,9		98,9
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	116,8		56,8
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	114,5		89,5
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,4		115,4
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	117,0		47,0
51	38	37	36	0	60,0	0.000	0.000	KNOWN	117,1		57,1
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	114,2		104,2
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	107,8		87,8
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	117,1		97,1
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	120,3		110,3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67,0	0,0067	KNOWN	28,241	18.220
81	3	2	48.0	800.0	86,0	0,0012	KNOWN	2,199	1,419
6	2	6	48.0	4960.0	86,0	0.0072	KNOWN	18,959	12.232
7	2	12	48.0	1920.0	70,0	0,0041	KNOWN	22,619	14,593
8	3	5	30.0	1600.0	65,0	0,0386	KNOWN	6,559	4.232
9	4	5	48.0	2000.0	120,0	0.0016	KNOWN	21,793	14,060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,338	0,218
10	5	14	48,0	2080,0	120,0	0.0016	KNOWN	26,291	16,962
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0.450
3	6	8	40.0	4160.0	67,0	0,0234	KNOWN	12,599	8.128
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	26,559	17.135
16	9	8	16.0	592.0	40,0	0.7482	KNOWN	0,532	0,344
47	8	18	40.0	3200.0	67,0	0.0180	KNOWN	8,822	5.692
5	10	9	48.0	2240.0	86.0	0,0033	KNOWN	23,195	14,965
15	9	11	16.0	4000.0	40,0	5,0552	KNOWN	0,282	0.182
46	9	49	48.0	3350.0	85,0	0.0050	KNOWN	17,843	11,512
14	10	11	24.0	2720.0	35,0	0,6109	KNOWN	1,674	1,080
13	12	11	16.0	5120.0	40,0	6,4706	KNOWN	0,679	0,438
28	16	11	24.0	1650.0	30,0	0,4929	KNOWN	0,791	0,510
11	12	13	48.0	1440.0	70,0	0,0031	KNOWN	19,061	12,298
12	14	13	48.0	960.0	120,0	0,0008	KNOWN	13,374	8,628
17	13	16	48.0	5120.0	120,0	0,0040	KNOWN	29,485	19.023
18	14	15	24,0	3680,0	135,0	0,0680	KNOWN	11,638	7,508
19	17	15	16.0	3840.0	63,0	2,0943	KNOWN	1,433	0,924
73	15	20	24.0	1040.0	135,0	0,0192	KNOWN	11,118	7.173
75	16	17	30,0	950.0	80,0	0,0156	KNOWN	2,985	1,926
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	23,485	15.151
74	17	19	30.0	1200.0	0.0	99.9999	KNOWN	0,004	0.003
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	23,517	15.173
49	18	42	16.0	5600.0	70,0	2.5133	KNOWN	1,241	0.801
48	49	18	48.0	640.0	85,0	0,0010	KNOWN	18,443	11.898
20	20	19	16.0	3200,0	60,0	1,9101	KNOWN	2,283	1,473
24	19	23	30.0	5600.0	50,0	0.2193	KNOWN	3,967	2.559
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	2,517	1.624
21	20	21	24.0	6720.0	66.0	0,4668	KNOWN	5,797	3,740
23	23	21	20.0	5120.0	60,0	1,0309	KNOWN	0,651	0,420
22	21	53	20.0	8470.0	70,0	1.2823	KNOWN	3,116	2.010
30	22	25	20.0	1040.0	60,0	0,2094	KNOWN	6,847	4,417
29	32	22	48.0	1920.0	120,0	0.0015	KNOWN	16,489	10,638
44	22	49	48.0	3840.0	120,0	0,0030	KNOWN	5,432	3,505
33	46	23	30.0	4800.0	80,0	0,0788	KNOWN	0,920	0,594
34	23	54	20.0	1760.0	55,0	0.4163	KNOWN	2,159	1,393
43	25	24	16.0	2560.0	135,0	0,3409	KNOWN	1,564	1,009
65	24	29	16.0	3360.0	135,0	0,4474	KNOWN	1,167	0,753
64	24	33	36.0	2400.0	135,0	0,0062	KNOWN	8,373	5,402
52	40	24	30.0	4960.0	135,0	0,0309	KNOWN	8,489	5,476
76	25	30	20.0	800.0	63,0	0,1472	KNOWN	4,600	2,968
42	27	26	16.0	3200.0	60,0	1,9101	KNOWN	0,544	0,351
31	30	26	20.0	1600.0	78,0	0.1983	KNOWN	4,706	3,036
32	26	46	20.0	1760.0	60,0	0,3544	KNOWN	3,312	2,137
78	28	27	16.0	450.0	70,0	0,2020	KNOWN	2,086	1,346
77	27	43	16.0	1600.0	70,0	0,7181	KNOWN	1,201	0,775
66	29	28	30.0	2000.0	70,0	0.0420	KNOWN	10,361	6,685
67	28	43	30.0	1920.0	70,0	0,0403	KNOWN	7,764	5,009
63	33	29	30.0	800.0	135,0	0.0050	KNOWN	8,817	5,688
71	35	29	16.0	3200.0	135,0	0,4261	KNOWN	0,437	0,282
82	31	30	16.0	3900.0	70,0	1.7503	KNOWN	1,237	0,798
27	32	31	20.0	1600.0	50,0	0,4514	KNOWN	4,575	2,952
62	34	33	24.0	1920.0	135,0	0.0355	KNOWN	2,559	1,651
60	34	35	16.0	2800.0	135,0	0,3728	KNOWN	1,026	0,662
61	37	34	24.0	880.0	135,0	0.0163	KNOWN	4,907	3,166
59	36	35	16.0	2080.0	80,0	0,7292	KNOWN	0,624	0,403
58	37	36	16.0	2230.0	80,0	0,7818	KNOWN	0,692	0,447
57	39	36	16.0	2400.0	80,0	0,8414	KNOWN	1,250	0,806
56	38	37	30.0	1280.0	80,0	0,0210	KNOWN	7,491	4,833
55	39	38	30.0	560.0	80,0	0.0092	KNOWN	0,315	0,204
53	40	38	30.0	640.0	80,0	0,0105	KNOWN	8,492	5,479
54	42	39	16.0	960.0	70,0	0,4309	KNOWN	2,883	1,860
51	41	40	30.0	1280.0	80,0	0,0210	KNOWN	19,244	12,415
50	41	42	16.0	960.0	80,0	0,3365	KNOWN	2,960	1.909
68	43	55	30.0	1280.0	70,0	0,0269	KNOWN	8,453	5,454
41	44	45	30.0	2720.0	70,0	0.0572	KNOWN	3,137	2,024
69	55	44	30.0	1600.0	70,0	0.0336	KNOWN	6,144	3,964
40	45	46	30.0	1280.0	80,0	0,0210	KNOWN	1,029	0,664
39	45	47	16.0	2400.0	55,0	1.6828	KNOWN	1,135	0.732
38	46	51	20.0	1840.0	63,0	0,3385	KNOWN	2,457	1,585
72	47	48	20.0	5290.0	55,0	1,2512	KNOWN	1,385	0,893
37	51	47	20.0	800.0	55,0	0,1892	KNOWN	1,319	0,851
35	54	48	16.0	9100.0	55,0	6,3805	KNOWN	0,615	0.397
36	51	50	20.0	880.0	110,0	0,0577	KNOWN	1,137	0,734
79	54	50	20.0	1120.0	55,0	0.2649	KNOWN	0,459	0.296
70	55	52	16.0	3700.0	55,0	2.5943	KNOWN	1,597	1,030

TABLE - SLS57
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 75 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	140.4		120.4
3	81	8	0	0	20.0	8.758	5.650	KNOWN	140.4		120.4
4	9	0	0	0	20.0	21.793	14.060	KNOWN	139.5		119.5
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139.1		99.1
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	136.3		126.3
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	136.5		126.5
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	137.6		127.6
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	136.1		126.1
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139.0		119.0
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	138.3		118.3
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	138.3		103.3
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	129.0		94.0
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	136.4		121.4
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	121.3		106.3
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	135.3		115.3
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	121.3		106.3
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	127.6		97.6
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	117.1		77.1
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	135.6		125.6
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	118.3		108.3
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	127.3		112.3
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	128.0		118.0
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	121.9		106.9
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	122.5		112.5
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	123.3		113.3
29	65	66	63	71	15.0	0.000	0.000	KNOWN	126.6		111.6
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	125.5		115.5
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	128.1		118.1
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	135.9		125.9
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	126.9		106.9
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	127.1		107.1
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	126.7		116.7
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	127.1		117.1
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	127.5		112.5
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	128.4		113.4
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	128.4		113.4
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	128.9		108.9
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	134.0		99.0
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	131.5		116.5
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	121.5		111.5
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	119.0		104.0
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	118.4		103.4
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	118.4		98.4
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	116.3		56.3
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	114.0		89.0
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	135.5		115.5
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	116.5		46.5
51	38	37	36	0	60.0	0.000	0.000	KNOWN	116.6		56.6
52	78	0	0	0	10.0	-1.596	-1.030	KNOWN	113.8		103.8
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	106.6		86.6
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	116.6		96.6
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	120.0		110.0

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.027	1.308
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	18.496	11.933
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	22.917	14.785
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.730	4.342
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.248	0.160
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	26.555	17.132
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.465	8.042
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	26.227	16.921
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.537	0.346
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.693	5.608
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	22.902	14.776
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.269	0.173
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	17.555	11.326
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	1.635	1.055
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.655	0.423
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.866	0.559
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	19.286	12.443
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	11.091	7.155
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	27.339	17.638
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	14.270	9.207
19	15	17	16.0	3840.0	63.0	2.0943	KNOWN	2.020	1.303
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	10.297	6.643
75	16	17	30.0	950.0	0.0	99.9999	KNOWN	0.005	0.003
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	24.251	15.646
74	17	19	30.0	1200.0	135.0	0.0075	KNOWN	0.424	0.274
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	23.717	15.301
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.250	0.807
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	18.771	12.110
20	20	19	16.0	3200.0	60.0	1.9101	KNOWN	1.899	1.225
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	4.103	2.647
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	2.566	1.656
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	5.361	3.458
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.087	0.702
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.115	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	6.926	4.468
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	17.193	11.092
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	6.036	3.894
33	46	23	30.0	4800.0	80.0	0.0788	KNOWN	1.204	0.777
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.143	1.382
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	1.568	1.012
65	24	29	16.0	3360.0	135.0	0.4474	KNOWN	1.185	0.764
64	24	33	36.0	2400.0	135.0	0.0062	KNOWN	8.463	5.460
52	40	24	30.0	4960.0	135.0	0.0309	KNOWN	8.591	5.542
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	4.676	3.017
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.559	0.361
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.796	3.094
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	3.418	2.205
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	2.128	1.373
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	1.228	0.792
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	10.571	6.820
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	7.931	5.117
63	33	29	30.0	800.0	135.0	0.0050	KNOWN	8.985	5.796
71	35	29	16.0	3200.0	135.0	0.4261	KNOWN	0.402	0.259
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.252	0.808
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	4.640	2.993
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	2.599	1.677
60	34	35	16.0	2800.0	135.0	0.3728	KNOWN	1.067	0.688
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	4.983	3.215
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.653	0.421
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.704	0.454
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.266	0.817
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	7.578	4.889
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.330	0.213
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	8.565	5.526
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.914	1.880
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	19.419	12.528
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.981	1.923
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	8.648	5.579
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	3.331	2.149
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	6.338	4.089
40	45	46	30.0	1280.0	80.0	0.0210	KNOWN	1.260	0.813
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.141	0.736
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.467	1.592
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.385	0.894
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.314	0.848
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.614	0.396
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.153	0.744
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.444	0.286
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE - SLS58
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 28 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	140.5		120.5
3	81	8	0	0	20.0	8.758	5.650	KNOWN	140.5		120.5
4	9	0	0	0	20.0	21.793	14.060	KNOWN	139.7		119.7
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139.2		99.2
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	136.3		126.3
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	136.5		126.5
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	137.5		127.5
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	135.0		125.0
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139.1		119.1
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	138.4		118.4
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	138.6		103.6
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	134.6		99.6
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	136.0		121.0
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	135.4		120.4
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	135.3		115.3
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	134.8		119.8
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	133.8		103.8
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	123.6		83.6
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	135.5		125.5
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	125.0		115.0
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	129.2		114.2
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	130.2		120.2
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	126.3		111.3
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	126.5		116.5
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	126.9		116.9
29	65	66	63	71	15.0	0.000	0.000	KNOWN	128.8		113.8
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	128.9		118.9
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	134.2		124.2
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	135.7		125.7
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	129.0		109.0
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	129.1		109.1
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	128.8		118.8
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	128.9		118.9
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	129.3		114.3
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	129.9		114.9
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	129.9		114.9
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	130.4		110.4
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	134.3		99.3
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	132.2		117.2
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	125.9		115.9
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	124.7		109.7
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	124.6		109.6
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	124.7		104.7
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	122.7		62.7
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	120.4		95.4
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	135.5		115.5
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	123.0		53.0
51	38	37	36	0	60.0	0.000	0.000	KNOWN	123.0		63.0
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	118.9		108.9
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	113.1		93.1
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	123.1		103.1
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	125.1		115.1

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.288	1.476
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	19.066	12.301
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	22.606	14.585
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.468	4.173
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.414	0.267
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	26.127	16.856
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.465	8.042
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	26.798	17.289
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.467	0.301
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.624	5.564
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	22.969	14.819
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.503	0.325
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	17.457	11.263
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	2.139	1.380
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.783	0.505
28	16	11	24.0	1650.0	0.0	99.9999	KNOWN	0.000	0.000
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	19.014	12.267
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	15.959	10.296
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	31.939	20.606
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	8.967	5.785
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.578	0.373
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	7.593	4.899
75	16	17	30.0	950.0	135.0	0.0059	KNOWN	12.197	7.869
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	17.522	11.305
74	17	19	30.0	1200.0	135.0	0.0075	KNOWN	10.071	6.497
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	20.885	13.474
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.116	0.720
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	15.883	10.247
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	0.720	0.465
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.786	5.023
25	19	31	16.0	2000.0	60.0	1.1938	KNOWN	0.727	0.469
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	5.275	3.403
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.173	0.757
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.116	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.723	3.692
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	13.175	8.500
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	3.238	2.089
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.229	1.438
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.307	1.489
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	1.760	1.136
65	24	29	16.0	3360.0	135.0	0.4474	KNOWN	0.970	0.626
64	24	33	36.0	2400.0	135.0	0.0062	KNOWN	7.300	4.710
52	40	24	30.0	4960.0	135.0	0.0309	KNOWN	7.022	4.530
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.280	2.116
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.261	0.168
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	3.969	2.561
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.292	1.479
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.513	0.976
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.911	0.587
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.801	5.033
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.777	3.727
63	33	29	30.0	800.0	135.0	0.0050	KNOWN	6.905	4.455
71	35	29	16.0	3200.0	135.0	0.4261	KNOWN	0.029	0.019
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.819	1.174
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.914	1.235
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	1.682	1.085
60	34	35	16.0	2800.0	135.0	0.3728	KNOWN	0.842	0.543
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	3.841	2.478
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.400	0.258
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.632	0.408
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.086	0.701
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	6.364	4.106
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.018	0.012
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	7.609	4.909
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.476	1.598
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	16.896	10.900
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.678	1.728
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.176	3.984
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.765	0.494
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.866	2.494
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.157	0.747
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.087	0.701
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.357	1.520
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.378	0.889
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.361	0.878
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.622	0.401
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.996	0.643
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.601	0.387
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE – SLS59
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 14 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	140.4		120.4
3	81	8	0	0	20.0	8.758	5.650	KNOWN	140.4		120.4
4	9	0	0	0	20.0	21.793	14.060	KNOWN	139.5		119.5
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139.1		99.1
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	136.2		126.2
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	136.4		126.4
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	137.6		127.6
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	135.5		125.5
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139.0		119.0
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	138.2		118.2
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	138.4		103.4
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	134.4		99.4
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	135.7		120.7
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	135.1		120.1
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	135.1		115.1
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	134.6		119.6
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	133.6		103.6
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	123.4		83.4
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	135.3		125.3
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	124.8		114.8
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	129.0		114.0
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	130.0		120.0
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	126.1		111.1
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	126.3		116.3
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	126.7		116.7
29	65	66	63	71	15.0	0.000	0.000	KNOWN	128.6		113.6
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	128.7		118.7
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	133.9		123.9
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	135.4		125.4
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	128.8		108.8
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	128.9		108.9
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	128.6		118.6
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	128.7		118.7
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	129.1		114.1
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	129.7		114.7
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	129.7		114.7
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	130.2		110.2
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	134.1		99.1
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	132.0		117.0
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	125.7		115.7
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	124.5		109.5
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	124.4		109.4
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	124.4		104.4
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	122.5		62.5
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	120.2		95.2
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	135.3		115.3
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	122.7		52.7
51	38	37	36	0	60.0	0.000	0.000	KNOWN	122.8		62.8
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	118.7		108.7
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	112.9		92.9
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	122.8		102.8
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	124.9		114.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	2.100	1.355
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	18.431	11.891
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	23.054	14.874
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	6.657	4.295
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.369	0.238
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	26.361	17.007
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	12.726	8.210
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	25.902	16.711
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.547	0.353
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.963	5.783
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	24.212	15.621
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.386	0.249
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	18.741	12.091
14	10	11	24.0	2720.0	0.0	99.9999	KNOWN	0.001	0.000
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.711	0.459
28	16	11	24.0	1650.0	135.0	0.0305	KNOWN	2.289	1.477
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	19.489	12.574
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	16.158	10.424
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	32.605	21.036
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	9.010	5.813
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.554	0.358
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	7.611	4.910
75	16	17	30.0	950.0	135.0	0.0059	KNOWN	12.121	7.820
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	15.958	10.296
74	17	19	30.0	1200.0	135.0	0.0075	KNOWN	10.017	6.462
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	20.916	13.494
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.117	0.721
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	15.565	10.042
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	0.702	0.453
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.766	5.010
25	19	31	16.0	2000.0	60.0	1.1938	KNOWN	0.712	0.460
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	5.275	3.403
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.173	0.757
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.115	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.724	3.693
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	11.600	7.484
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	1.614	1.042
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.210	1.426
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.305	1.487
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	1.751	1.130
65	24	29	16.0	3360.0	135.0	0.4474	KNOWN	0.971	0.626
64	24	33	36.0	2400.0	135.0	0.0062	KNOWN	7.305	4.713
52	40	24	30.0	4960.0	135.0	0.0309	KNOWN	7.036	4.539
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.290	2.123
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.267	0.172
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	3.971	2.562
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.300	1.484
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.519	0.980
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.911	0.588
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.820	5.045
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.789	3.735
63	33	29	30.0	800.0	135.0	0.0050	KNOWN	6.913	4.460
71	29	35	16.0	3200.0	135.0	0.4261	KNOWN	0.063	0.041
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.812	1.169
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.921	1.240
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	1.685	1.087
60	34	35	16.0	2800.0	135.0	0.3728	KNOWN	0.848	0.547
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	3.851	2.485
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.405	0.261
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.634	0.409
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.089	0.702
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	6.376	4.113
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.074	0.048
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	7.619	4.915
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.480	1.600
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	16.918	10.915
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.681	1.729
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.189	3.993
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.872	0.563
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.879	2.503
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.145	0.739
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.087	0.701
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.358	1.521
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.378	0.889
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.360	0.878
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.622	0.401
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.998	0.644
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.599	0.386
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE – SLS60
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 11 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	142.1		122.1
3	81	8	0	0	20.0	8.758	5.650	KNOWN	142.1		122.1
4	9	0	0	0	20.0	21.793	14.060	KNOWN	138.1		118.1
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	137.6		97.6
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	135.6		125.6
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	135.6		125.6
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	136.9		126.9
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	135.2		125.2
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	142.0		122.0
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	136.0		116.0
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	136.4		101.4
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	132.7		97.7
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	134.6		119.6
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	134.0		119.0
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	134.2		114.2
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	133.5		118.5
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	132.0		102.0
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	122.1		82.1
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	134.3		124.3
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	123.7		113.7
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	128.1		113.1
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	129.0		119.0
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	125.1		110.1
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	125.3		115.3
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	125.7		115.7
29	65	66	63	71	15.0	0.000	0.000	KNOWN	127.6		112.6
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	127.7		117.7
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	132.9		122.9
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	134.4		124.4
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	127.8		107.8
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	127.9		107.9
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	127.6		117.6
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	127.8		117.8
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	128.1		113.1
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	128.8		113.8
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	128.8		113.8
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	129.2		109.2
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	133.2		98.2
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	131.1		116.1
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	124.6		114.6
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	123.4		108.4
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	123.4		108.4
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	123.4		103.4
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	121.4		61.4
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	119.1		94.1
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	134.3		114.3
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	121.7		51.7
51	38	37	36	0	60.0	0.000	0.000	KNOWN	121.7		61.7
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	117.7		107.7
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	111.6		91.6
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	121.8		101.8
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	123.8		113.8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	4.303	2.776
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	27.626	17.823
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	7.451	4.807
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	13.060	8.426
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	12	5	16.0	1280.0	75.0	0.5056	KNOWN	3.194	2.061
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	36.327	23.437
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	14.280	9.213
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	33.543	21.641
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.280	0.181
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	10.252	6.614
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	25.075	16.177
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.277	0.178
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	19.976	12.888
14	10	11	24.0	2720.0	135.0	0.0503	KNOWN	6.779	4.374
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.028	0.663
28	11	16	24.0	1650.0	135.0	0.0305	KNOWN	4.658	3.005
11	12	13	48.0	1440.0	0.0	99.9999	KNOWN	0.009	0.006
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	26.587	17.153
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	23.558	15.199
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	8.546	5.514
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.759	0.490
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	7.353	4.744
75	16	17	30.0	950.0	135.0	0.0059	KNOWN	12.449	8.032
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	13.551	8.742
74	17	19	30.0	1200.0	135.0	0.0075	KNOWN	10.140	6.542
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	20.997	13.546
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.121	0.723
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	14.362	9.266
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	0.873	0.563
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.758	5.005
25	19	31	16.0	2000.0	60.0	1.1938	KNOWN	0.673	0.434
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	5.187	3.347
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.261	0.813
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.115	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.742	3.705
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	9.180	5.922
44	49	22	48.0	3840.0	120.0	0.0030	KNOWN	0.734	0.474
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.123	1.370
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.297	1.482
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	1.741	1.123
65	24	29	16.0	3360.0	135.0	0.4474	KNOWN	0.977	0.630
64	24	33	36.0	2400.0	135.0	0.0062	KNOWN	7.334	4.731
52	40	24	30.0	4960.0	135.0	0.0309	KNOWN	7.080	4.568
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.319	2.141
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.275	0.177
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	3.992	2.575
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.329	1.503
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.536	0.991
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.920	0.593
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.894	5.093
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.847	3.772
63	33	29	30.0	800.0	135.0	0.0050	KNOWN	6.967	4.495
71	29	35	16.0	3200.0	135.0	0.4261	KNOWN	0.049	0.032
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.804	1.164
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.953	1.260
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	1.711	1.104
60	34	35	16.0	2800.0	135.0	0.3728	KNOWN	0.855	0.552
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	3.883	2.505
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.413	0.266
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.636	0.410
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.094	0.706
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	6.410	4.136
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.081	0.052
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	7.647	4.933
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.493	1.608
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	16.990	10.961
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.689	1.735
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.255	4.036
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.939	0.606
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.946	2.546
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.081	0.698
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.090	0.703
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.364	1.525
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.378	0.889
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.358	0.876
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.621	0.401
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.006	0.649
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.591	0.381
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE - SLS61
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 7 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	143.1		123.1
3	81	8	0	0	20.0	8.758	5.650	KNOWN	143.1		123.1
4	9	0	0	0	20.0	21.793	14.060	KNOWN	136.7		116.7
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	136.2		96.2
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	135.1		125.1
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	135.1		125.1
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	136.6		126.6
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	134.3		124.3
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	134.8		114.8
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	134.8		114.8
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	135.1		100.1
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	131.6		96.6
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	133.7		118.7
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	133.1		118.1
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	133.5		113.5
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	132.5		117.5
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	130.8		100.8
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	121.2		81.2
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	133.6		123.6
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	122.8		112.8
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	127.3		112.3
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	128.2		118.2
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	124.3		109.3
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	124.4		114.4
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	124.9		114.9
29	65	66	63	71	15.0	0.000	0.000	KNOWN	126.8		111.8
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	126.8		116.8
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	132.0		122.0
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	133.6		123.6
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	127.0		107.0
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	127.1		107.1
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	126.8		116.8
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	127.0		117.0
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	127.3		112.3
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	128.0		113.0
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	128.0		113.0
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	128.4		108.4
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	132.5		97.5
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	130.3		115.3
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	123.8		113.8
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	122.6		107.6
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	122.5		107.5
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	122.5		102.5
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	120.5		60.5
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	118.3		93.3
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	133.6		113.6
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	120.8		50.8
51	38	37	36	0	60.0	0.000	0.000	KNOWN	120.9		60.9
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	116.8		106.8
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	110.6		90.6
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	120.9		100.9
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	123.0		113.0

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHANGE CFS	DISCHANGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	7.615	4.913
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	31.761	20.491
7	2	12	48.0	1920.0	0.0	99.9999	KNOWN	0.009	0.006
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	16.373	10.563
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.773	1.144
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	34.672	22.369
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	15.401	9.936
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	36.556	23.585
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.198	0.128
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	11.291	7.284
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	27.066	17.462
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.367	0.237
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	21.959	14.167
14	10	11	24.0	2720.0	135.0	0.0503	KNOWN	7.801	5.033
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.243	0.157
28	11	16	24.0	1650.0	135.0	0.0305	KNOWN	4.985	3.216
11	13	12	48.0	1440.0	135.0	0.0009	KNOWN	1.599	1.032
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	25.105	16.197
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	20.383	13.150
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	8.374	5.402
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.828	0.534
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	7.249	4.677
75	16	17	30.0	950.0	135.0	0.0059	KNOWN	12.528	8.083
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	10.623	6.854
74	17	19	30.0	1200.0	135.0	0.0075	KNOWN	10.150	6.548
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	21.062	13.588
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.124	0.725
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	13.391	8.639
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	0.934	0.603
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.737	4.991
25	19	31	16.0	2000.0	60.0	1.1938	KNOWN	0.642	0.414
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	5.145	3.319
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.303	0.841
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.116	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.747	3.708
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	6.232	4.020
44	49	22	48.0	3840.0	120.0	0.0030	KNOWN	3.747	2.417
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.066	1.333
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.291	1.478
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	1.726	1.114
65	24	29	16.0	3360.0	135.0	0.4474	KNOWN	0.980	0.632
64	24	33	36.0	2400.0	135.0	0.0062	KNOWN	7.351	4.743
52	40	24	30.0	4960.0	135.0	0.0309	KNOWN	7.117	4.592
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.339	2.154
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.283	0.182
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	4.002	2.582
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.347	1.514
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.549	0.999
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.925	0.597
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.947	5.127
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.887	3.798
63	33	29	30.0	800.0	135.0	0.0050	KNOWN	7.005	4.519
71	29	35	16.0	3200.0	135.0	0.4261	KNOWN	0.038	0.024
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.794	1.157
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.974	1.273
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	1.731	1.117
60	34	35	16.0	2800.0	135.0	0.3728	KNOWN	0.861	0.555
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	3.909	2.522
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.419	0.270
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.638	0.412
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.098	0.709
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	6.438	4.154
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.087	0.056
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	7.668	4.947
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.503	1.615
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	17.048	10.999
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.696	1.740
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.301	4.065
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.984	0.635
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.991	2.575
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.038	0.669
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.092	0.704
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.368	1.527
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.379	0.889
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.356	0.875
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.621	0.401
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.011	0.652
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.585	0.378
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE - SLS62
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 8 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	140.3		120.3
3	81	8	0	0	20.0	8.758	5.650	KNOWN	140.4		120.4
4	9	0	0	0	20.0	21.793	14.060	KNOWN	140.2		120.2
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139.7		99.7
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	136.5		126.5
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	136.7		126.7
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	137.6		127.6
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	136.7		126.7
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139.6		119.6
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	139.2		119.2
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	139.3		104.3
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	135.3		100.3
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	136.6		121.6
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	136.0		121.0
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	135.7		115.7
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	135.5		120.5
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	134.5		104.5
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	124.2		84.2
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	136.0		126.0
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	125.6		115.6
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	129.7		114.7
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	130.7		120.7
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	126.8		111.8
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	127.0		117.0
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	127.4		117.4
29	65	66	63	71	15.0	0.000	0.000	KNOWN	129.3		114.3
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	129.4		119.4
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	134.8		124.8
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	136.2		126.2
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	129.4		109.4
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	129.5		109.5
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	129.3		119.3
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	129.4		119.4
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	129.7		114.7
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	130.4		115.4
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	130.4		115.4
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	130.8		110.8
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	134.7		99.7
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	132.7		117.7
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	126.4		116.4
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	125.2		110.2
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	125.2		110.2
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	125.2		105.2
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	123.2		63.2
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	121.0		96.0
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	135.9		115.9
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	123.5		53.5
51	38	37	36	0	60.0	0.000	0.000	KNOWN	123.6		63.6
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	119.4		109.4
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	113.7		93.7
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	123.6		103.6
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	125.6		115.6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHANGE CFS	DISCHANGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	8.757	5.650
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	18.073	11.660
7	2	12	48.0	1920.0	135.0	0.0012	KNOWN	30.014	19.364
8	3	5	30.0	1600.0	0.0	99.9999	KNOWN	0.001	0.000
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	-0.330	0.213
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	19.744	12.738
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	11.714	7.557
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	26.555	17.133
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.424	0.273
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	7.828	5.050
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	20.304	13.099
15	11	9	16.0	4000.0	40.0	5.0552	KNOWN	0.057	0.037
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	15.431	9.955
14	10	11	24.0	2720.0	135.0	0.0503	KNOWN	4.562	2.943
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	0.651	0.420
28	11	16	24.0	1650.0	135.0	0.0305	KNOWN	1.720	1.110
11	12	13	48.0	1440.0	135.0	0.0009	KNOWN	26.524	17.112
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	9.530	6.148
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	33.016	21.300
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	9.020	5.820
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.562	0.363
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	7.630	4.922
75	16	17	30.0	950.0	135.0	0.0059	KNOWN	12.244	7.899
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	20.251	13.065
74	17	19	30.0	1200.0	135.0	0.0075	KNOWN	10.131	6.536
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	20.816	13.430
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.113	0.718
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	16.596	10.707
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	0.707	0.456
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.827	5.050
25	19	31	16.0	2000.0	60.0	1.1938	KNOWN	0.761	0.491
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	5.298	3.418
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.150	0.742
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.116	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.721	3.691
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	15.938	10.283
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	5.699	3.677
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.287	1.476
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.313	1.492
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	1.780	1.148
65	24	29	16.0	3360.0	135.0	0.4474	KNOWN	0.966	0.623
64	24	33	36.0	2400.0	135.0	0.0062	KNOWN	7.282	4.698
52	40	24	30.0	4960.0	135.0	0.0309	KNOWN	6.980	4.503
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.259	2.103
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.254	0.164
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	3.962	2.556
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.278	1.470
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.499	0.967
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.905	0.584
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.744	4.996
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.733	3.699
63	33	29	30.0	800.0	135.0	0.0050	KNOWN	6.858	4.425
71	29	35	16.0	3200.0	135.0	0.4261	KNOWN	0.081	0.052
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.835	1.184
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.895	1.223
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	1.654	1.067
60	34	35	16.0	2800.0	135.0	0.3728	KNOWN	0.841	0.543
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	3.812	2.459
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.396	0.255
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.631	0.407
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.083	0.698
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	6.334	4.086
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.065	0.042
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	7.586	4.894
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.465	1.590
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	16.829	10.857
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.670	1.723
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.126	3.952
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.809	0.522
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.816	2.462
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.205	0.778
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.085	0.700
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.353	1.518
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.378	0.889
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.362	0.879
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.622	0.401
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.990	0.639
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.606	0.391
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE - SLS63
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPES 13, 15 & 16 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,3		120,3
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,3		120,3
4	9	0	0	0	20,0	21,793	14,060	KNOWN	140,6		120,6
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	140,1		100,1
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,5		126,5
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	136,7		126,7
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,6		127,6
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	136,8		126,8
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,8		119,8
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	139,4		119,4
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	139,5		104,5
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	135,5		100,5
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	136,7		121,7
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	136,1		121,1
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,8		115,8
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	135,6		120,6
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	134,6		104,6
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	124,3		84,3
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	136,0		126,0
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	125,6		115,6
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	129,7		114,7
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	130,7		120,7
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	126,9		111,9
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	127,0		117,0
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	127,5		117,5
29	65	66	63	71	15,0	0,000	0,000	KNOWN	129,3		114,3
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	129,4		119,4
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	134,8		124,8
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	136,3		126,3
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	129,5		109,5
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,6		109,6
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	129,3		119,3
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	129,5		119,5
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	129,8		114,8
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,4		115,4
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,4		115,4
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	130,9		110,9
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,8		99,8
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,7		117,7
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	126,5		116,5
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	125,3		110,3
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	125,2		110,2
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	125,3		105,3
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	123,3		63,3
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	121,0		96,0
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,9		115,9
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	123,6		53,6
51	38	37	36	0	60,0	0,000	0,000	KNOWN	123,6		63,6
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	119,5		109,5
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	113,8		93,8
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	123,7		103,7
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	125,7		115,7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48,0	2880,0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48,0	800,0	86,0	0,0012	KNOWN	4,187	2,701
6	2	6	48,0	4960,0	86,0	0,0072	KNOWN	17,823	11,499
7	2	12	48,0	1920,0	135,0	0,0012	KNOWN	25,829	16,664
8	3	5	30,0	1600,0	135,0	0,0100	KNOWN	4,490	2,897
9	4	5	48,0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16,0	1280,0	75,0	0,5056	KNOWN	0,827	0,534
10	5	14	48,0	2080,0	120,0	0,0016	KNOWN	23,736	15,313
1	7	6	16,0	11700,0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40,0	4160,0	67,0	0,0234	KNOWN	11,786	7,604
4	6	10	48,0	1920,0	86,0	0,0028	KNOWN	26,234	16,925
16	9	8	16,0	592,0	0,0	99,9999	KNOWN	0,000	0,000
47	8	18	40,0	3200,0	67,0	0,0180	KNOWN	7,477	4,824
5	10	9	48,0	2240,0	86,0	0,0033	KNOWN	20,007	12,907
15	11	9	16,0	4000,0	0,0	99,9999	KNOWN	0,000	0,000
46	9	49	48,0	3350,0	85,0	0,0050	KNOWN	15,465	9,977
14	10	11	24,0	2720,0	135,0	0,0503	KNOWN	4,538	2,928
13	12	11	16,0	5120,0	0,0	99,9999	KNOWN	0,000	0,000
28	11	16	24,0	1650,0	135,0	0,0305	KNOWN	1,112	0,718
11	12	13	48,0	1440,0	135,0	0,0009	KNOWN	23,432	15,117
12	14	13	48,0	960,0	120,0	0,0008	KNOWN	13,437	8,669
17	13	16	48,0	5120,0	120,0	0,0040	KNOWN	33,831	21,827
18	14	15	24,0	3680,0	135,0	0,0680	KNOWN	9,105	5,874
19	17	15	16,0	3840,0	63,0	2,0943	KNOWN	0,523	0,338
73	15	20	24,0	1040,0	135,0	0,0192	KNOWN	7,675	4,952
75	16	17	30,0	950,0	135,0	0,0059	KNOWN	12,185	7,861
26	16	32	48,0	1950,0	120,0	0,0015	KNOWN	20,542	13,253
74	17	19	30,0	1200,0	135,0	0,0075	KNOWN	10,112	6,524
45	18	41	48,0	4550,0	120,0	0,0036	KNOWN	20,795	13,416
49	18	42	16,0	5600,0	70,0	2,5133	KNOWN	1,112	0,717
48	49	18	48,0	640,0	85,0	0,0010	KNOWN	16,925	10,919
20	19	20	16,0	3200,0	60,0	1,9101	KNOWN	0,676	0,436
24	19	23	30,0	5600,0	50,0	0,2193	KNOWN	7,831	5,052
25	19	31	16,0	2000,0	60,0	1,1938	KNOWN	0,768	0,495
21	20	21	24,0	6720,0	66,0	0,4668	KNOWN	5,314	3,428
23	23	21	20,0	5120,0	60,0	1,0309	KNOWN	1,134	0,732
22	21	53	20,0	8470,0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20,0	1040,0	60,0	0,2094	KNOWN	5,721	3,691
29	32	22	48,0	1920,0	120,0	0,0015	KNOWN	16,234	10,473
44	22	49	48,0	3840,0	120,0	0,0030	KNOWN	6,277	4,049
33	23	46	30,0	4800,0	80,0	0,0788	KNOWN	2,305	1,487
34	23	54	20,0	1760,0	55,0	0,4163	KNOWN	2,315	1,494
43	25	24	16,0	2560,0	135,0	0,3409	KNOWN	1,786	1,152
65	24	29	16,0	3360,0	135,0	0,4474	KNOWN	0,965	0,623
64	24	33	36,0	2400,0	135,0	0,0062	KNOWN	7,277	4,695
52	40	24	30,0	4960,0	135,0	0,0309	KNOWN	6,968	4,495
76	25	30	20,0	800,0	63,0	0,1472	KNOWN	3,254	2,099
42	27	26	16,0	3200,0	60,0	1,9101	KNOWN	0,251	0,162
31	30	26	20,0	1600,0	78,0	0,1983	KNOWN	3,959	2,554
32	26	46	20,0	1760,0	60,0	0,3544	KNOWN	2,273	1,466
78	28	27	16,0	450,0	70,0	0,2020	KNOWN	1,495	0,965
77	27	43	16,0	1600,0	70,0	0,7181	KNOWN	0,903	0,583
66	29	28	30,0	2000,0	70,0	0,0420	KNOWN	7,727	4,985
67	28	43	30,0	1920,0	70,0	0,0403	KNOWN	5,721	3,691
63	33	29	30,0	800,0	135,0	0,0050	KNOWN	6,846	4,417
71	29	35	16,0	3200,0	135,0	0,4261	KNOWN	0,084	0,054
82	31	30	16,0	3900,0	70,0	1,7503	KNOWN	1,837	1,185
27	32	31	20,0	1600,0	50,0	0,4514	KNOWN	1,891	1,220
62	34	33	24,0	1920,0	135,0	0,0355	KNOWN	1,647	1,062
60	34	35	16,0	2800,0	135,0	0,3728	KNOWN	0,839	0,541
61	37	34	24,0	880,0	135,0	0,0163	KNOWN	3,804	2,454
59	36	35	16,0	2080,0	80,0	0,7292	KNOWN	0,394	0,254
58	37	36	16,0	2230,0	80,0	0,7818	KNOWN	0,630	0,407
57	39	36	16,0	2400,0	80,0	0,8414	KNOWN	1,081	0,698
56	38	37	30,0	1280,0	80,0	0,0210	KNOWN	6,325	4,081
55	39	38	30,0	560,0	80,0	0,0092	KNOWN	0,063	0,041
53	40	38	30,0	640,0	80,0	0,0105	KNOWN	7,579	4,890
54	42	39	16,0	960,0	70,0	0,4309	KNOWN	2,462	1,588
51	41	40	30,0	1280,0	80,0	0,0210	KNOWN	16,810	10,845
50	41	42	16,0	960,0	80,0	0,3365	KNOWN	2,668	1,721
68	43	55	30,0	1280,0	70,0	0,0269	KNOWN	6,112	3,943
41	44	45	30,0	2720,0	70,0	0,0572	KNOWN	0,796	0,513
69	55	44	30,0	1600,0	70,0	0,0336	KNOWN	3,803	2,453
40	46	45	30,0	1280,0	80,0	0,0210	KNOWN	1,219	0,786
39	45	47	16,0	2400,0	55,0	1,6828	KNOWN	1,084	0,699
38	46	51	20,0	1840,0	63,0	0,3385	KNOWN	2,351	1,517
72	47	48	20,0	5290,0	55,0	1,2512	KNOWN	1,377	0,889
37	51	47	20,0	800,0	55,0	0,1892	KNOWN	1,363	0,879
35	54	48	16,0	9100,0	55,0	6,3805	KNOWN	0,622	0,401
36	51	50	20,0	880,0	110,0	0,0577	KNOWN	0,989	0,638
79	54	50	20,0	1120,0	55,0	0,2649	KNOWN	0,608	0,392
70	55	52	16,0	3700,0	55,0	2,5943	KNOWN	1,597	1,030

TABLE - SLS64
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 48 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	140,5		120,5
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,5		120,5
4	9	0	0	0	20,0	21,793	14,060	KNOWN	140,9		120,9
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	140,4		100,4
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	134,0		124,0
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	137,3		127,3
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	137,9		127,9
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	137,5		127,5
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	140,0		120,0
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	139,8		119,8
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	139,8		104,8
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	135,7		100,7
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	137,5		122,5
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	136,8		121,8
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	129,1		109,1
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	136,1		121,1
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	134,8		104,8
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	122,9		82,9
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	137,2		127,2
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	123,5		113,5
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	125,2		110,2
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	128,5		118,5
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	124,0		109,0
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	123,7		113,7
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	123,8		113,8
29	65	66	63	71	15,0	0,000	0,000	KNOWN	124,8		109,8
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	127,2		117,2
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	135,2		125,2
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	137,3		127,3
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	124,9		104,9
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	124,9		104,9
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	124,7		114,7
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	124,8		114,8
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	125,0		110,0
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	125,4		110,4
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	125,4		110,4
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	125,8		105,8
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	128,4		93,4
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	126,9		111,9
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	123,1		113,1
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	122,5		107,5
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	122,5		107,5
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	122,6		102,6
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	120,7		60,7
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	118,5		93,5
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	137,2		117,2
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	121,1		51,1
51	38	37	36	0	60,0	0,000	0,000	KNOWN	121,1		61,1
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	116,5		106,5
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	112,4		92,4
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	121,2		101,2
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	122,7		112,7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48,0	2880,0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48,0	800,0	86,0	0,0012	KNOWN	4,934	3,183
6	2	6	48,0	4960,0	86,0	0,0072	KNOWN	19,197	12,385
7	2	12	48,0	1920,0	135,0	0,0012	KNOWN	25,123	16,208
8	3	5	30,0	1600,0	135,0	0,0100	KNOWN	3,824	2,467
9	4	5	48,0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16,0	1280,0	75,0	0,5056	KNOWN	0,855	0,551
10	5	14	48,0	2080,0	120,0	0,0016	KNOWN	23,042	14,866
1	7	6	16,0	11700,0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40,0	4160,0	67,0	0,0234	KNOWN	17,574	11,338
4	6	10	48,0	1920,0	86,0	0,0028	KNOWN	21,812	14,072
16	9	8	16,0	592,0	135,0	0,0788	KNOWN	7,444	4,802
47	8	18	40,0	3200,0	67,0	0,0180	KNOWN	20,710	13,362
5	10	9	48,0	2240,0	86,0	0,0033	KNOWN	17,166	11,075
15	11	9	16,0	4000,0	135,0	0,5326	KNOWN	0,668	0,431
46	9	49	48,0	3350,0	85,0	0,0050	KNOWN	5,836	3,765
14	10	11	24,0	2720,0	135,0	0,0503	KNOWN	2,973	1,918
13	12	11	16,0	5120,0	135,0	0,6818	KNOWN	2,001	1,291
28	11	16	24,0	1650,0	135,0	0,0305	KNOWN	0,860	0,555
11		13	48,0	1440,0	135,0	0,0009	KNOWN	20,752	13,389
12	1	13	48,0	960,0	120,0	0,0008	KNOWN	12,635	8,152
17	13	16	48,0	5120,0	120,0	0,0040	KNOWN	30,349	19,580
18	14	15	24,0	3680,0	135,0	0,0680	KNOWN	9,213	5,944
19	17	15	16,0	3840,0	63,0	2,0943	KNOWN	0,702	0,453
73	15	20	24,0	1040,0	135,0	0,0192	KNOWN	7,962	5,137
75	16	17	30,0	950,0	135,0	0,0059	KNOWN	13,660	8,813
26	16	32	48,0	1950,0	120,0	0,0015	KNOWN	15,351	9,904
74	17	19	30,0	1200,0	135,0	0,0075	KNOWN	11,408	7,360
45	18	41	48,0	4550,0	120,0	0,0036	KNOWN	17,286	11,152
49	18	42	16,0	5600,0	70,0	2,5133	KNOWN	0,945	0,610
48	49	18	48,0	640,0	0,0	99,9999	KNOWN	0,016	0,010
20	19	20	16,0	3200,0	60,0	1,9101	KNOWN	0,814	0,525
24	19	23	30,0	5600,0	50,0	0,2193	KNOWN	8,928	5,755
25	19	31	16,0	2000,0	60,0	1,1938	KNOWN	0,838	0,540
21	20	21	24,0	6720,0	66,0	0,4668	KNOWN	5,737	3,701
23	23	21	20,0	5120,0	60,0	1,0309	KNOWN	0,709	0,457
22	21	53	20,0	8470,0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20,0	1040,0	60,0	0,2094	KNOWN	7,444	4,803
29	32	22	48,0	1920,0	120,0	0,0015	KNOWN	10,670	6,884
44	49	22	48,0	3840,0	120,0	0,0030	KNOWN	0,752	0,485
33	23	46	30,0	4800,0	80,0	0,0788	KNOWN	3,645	2,352
34	23	54	20,0	1760,0	55,0	0,4163	KNOWN	2,487	1,605
43	25	24	16,0	2560,0	135,0	0,3409	KNOWN	3,447	2,224
65	24	29	16,0	3360,0	135,0	0,4474	KNOWN	0,857	0,553
64	24	33	36,0	2400,0	135,0	0,0062	KNOWN	7,008	4,521
52	40	24	30,0	4960,0	135,0	0,0309	KNOWN	4,929	3,180
76	25	30	20,0	800,0	63,0	0,1472	KNOWN	3,311	2,136
42	26	27	16,0	3200,0	60,0	1,9101	KNOWN	0,414	0,267
31	30	26	20,0	1600,0	78,0	0,1983	KNOWN	4,465	2,880
32	26	46	20,0	1760,0	60,0	0,3544	KNOWN	2,111	1,362
78	28	27	16,0	450,0	70,0	0,2020	KNOWN	0,763	0,492
77	27	43	16,0	1600,0	70,0	0,7181	KNOWN	0,835	0,539
66	29	28	30,0	2000,0	70,0	0,0420	KNOWN	5,712	3,685
67	28	43	30,0	1920,0	70,0	0,0403	KNOWN	4,437	2,863
63	33	29	30,0	800,0	135,0	0,0050	KNOWN	5,301	3,420
71	29	35	16,0	3200,0	135,0	0,4261	KNOWN	0,446	0,288
82	31	30	16,0	3900,0	70,0	1,7503	KNOWN	2,278	1,470
27	32	31	20,0	1600,0	50,0	0,4514	KNOWN	2,263	1,460
62	34	33	24,0	1920,0	135,0	0,0355	KNOWN	0,369	0,238
60	34	35	16,0	2800,0	135,0	0,3728	KNOWN	0,735	0,474
61	37	34	24,0	880,0	135,0	0,0163	KNOWN	2,421	1,562
59	36	35	16,0	2080,0	80,0	0,7292	KNOWN	0,137	0,088
58	37	36	16,0	2230,0	80,0	0,7818	KNOWN	0,570	0,368
57	39	36	16,0	2400,0	80,0	0,8414	KNOWN	0,885	0,571
56	38	37	30,0	1280,0	80,0	0,0210	KNOWN	4,882	3,150
55	38	39	30,0	560,0	80,0	0,0092	KNOWN	0,284	0,183
53	40	38	30,0	640,0	80,0	0,0105	KNOWN	6,483	4,183
54	42	39	16,0	960,0	70,0	0,4309	KNOWN	1,918	1,238
51	41	40	30,0	1280,0	80,0	0,0210	KNOWN	13,675	8,822
50	41	42	16,0	960,0	80,0	0,3365	KNOWN	2,291	1,478
68	43	55	30,0	1280,0	70,0	0,0269	KNOWN	4,761	3,072
41	45	44	30,0	2720,0	70,0	0,0572	KNOWN	0,555	0,358
69	55	44	30,0	1600,0	70,0	0,0336	KNOWN	2,452	1,582
40	46	45	30,0	1280,0	80,0	0,0210	KNOWN	2,508	1,618
39	45	47	16,0	2400,0	55,0	1,6828	KNOWN	1,022	0,660
38	46	51	20,0	1840,0	63,0	0,3385	KNOWN	2,241	1,446
72	47	48	20,0	5290,0	55,0	1,2512	KNOWN	1,368	0,883
37	51	47	20,0	800,0	55,0	0,1892	KNOWN	1,416	0,913
35	54	48	16,0	9100,0	55,0	6,3805	KNOWN	0,631	0,407
36	51	50	20,0	880,0	110,0	0,0577	KNOWN	0,825	0,533
79	54	50	20,0	1120,0	55,0	0,2649	KNOWN	0,771	0,497
70	55	52	16,0	3700,0	55,0	2,5943	KNOWN	1,597	1,030

TABLE - SLS65
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 3 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	- STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	139.6		119.6
3	81	8	0	0	20.0	8.758	5.650	KNOWN	139.6		119.6
4	9	0	0	0	20.0	21.793	14.060	KNOWN	139.9		119.9
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139.4		99.4
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	134.2		124.2
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	135.5		125.5
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	136.9		126.9
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	135.9		125.9
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139.0		119.0
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	138.7		118.7
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	138.8		103.8
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	134.5		99.5
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	135.6		120.6
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	135.0		120.0
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	134.2		114.2
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	134.4		119.4
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	133.7		103.7
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	123.2		83.2
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	134.6		124.6
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	124.4		114.4
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	128.3		113.3
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	129.3		119.3
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	125.5		110.5
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	125.7		115.7
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	126.1		116.1
29	65	66	63	71	15.0	0.000	0.000	KNOWN	127.9		112.9
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	128.1		118.1
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	133.6		123.6
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	135.0		125.0
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	128.1		108.1
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	128.1		108.1
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	127.9		117.9
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	128.0		118.0
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	128.3		113.3
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	129.0		114.0
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	129.0		114.0
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	129.4		109.4
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	133.3		98.3
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	131.2		116.2
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	125.1		115.1
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	124.0		109.0
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	123.9		108.9
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	124.0		104.0
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	122.0		62.0
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	119.7		94.7
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	134.4		114.4
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	122.3		52.3
51	38	37	36	0	60.0	0.000	0.000	KNOWN	122.3		62.3
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	118.2		108.2
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	112.7		92.7
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	122.4		102.4
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	124.3		114.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.093	1.995
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	13.253	8.550
7	2	12	48.0	1920.0	135.0	0.0012	KNOWN	29.226	18.855
8	3	5	30.0	1600.0	135.0	0.0100	KNOWN	5.665	3.655
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.870	0.561
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	24.868	16.044
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	0.0	99.9999	KNOWN	0.003	0.002
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	33.446	21.578
16	9	8	16.0	592.0	135.0	0.0788	KNOWN	4.439	2.864
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	0.358	0.231
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	26.610	17.168
15	11	9	16.0	4000.0	135.0	0.5326	KNOWN	0.828	0.535
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	18.455	11.906
14	10	11	24.0	2720.0	135.0	0.0503	KNOWN	5.145	3.319
13	12	11	16.0	5120.0	135.0	0.6818	KNOWN	2.281	1.472
28	11	16	24.0	1650.0	135.0	0.0305	KNOWN	3.173	2.047
11	12	13	48.0	1440.0	135.0	0.0009	KNOWN	24.591	15.865
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	14.371	9.272
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	35.925	23.178
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	9.303	6.002
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.443	0.286
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	7.792	5.027
75	16	17	30.0	950.0	135.0	0.0059	KNOWN	12.171	7.852
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	24.707	15.940
74	17	19	30.0	1200.0	135.0	0.0075	KNOWN	10.181	6.569
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	20.658	13.328
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.105	0.713
48	49	18	48.0	640.0	135.0	0.0004	KNOWN	24.088	15.540
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	0.614	0.396
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.900	5.097
25	19	31	16.0	2000.0	60.0	1.1938	KNOWN	0.829	0.535
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	5.369	3.464
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.079	0.696
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.116	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.714	3.686
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	20.433	13.183
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	10.488	6.766
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.417	1.559
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.327	1.501
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	1.821	1.175
65	24	29	16.0	3360.0	135.0	0.4474	KNOWN	0.958	0.618
64	24	33	36.0	2400.0	135.0	0.0062	KNOWN	7.242	4.672
52	40	24	30.0	4960.0	135.0	0.0309	KNOWN	6.890	4.445
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.211	2.072
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.234	0.151
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	3.943	2.544
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.240	1.445
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.468	0.947
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.893	0.576
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.619	4.916
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.640	3.639
63	33	29	30.0	800.0	135.0	0.0050	KNOWN	6.767	4.366
71	29	35	16.0	3200.0	135.0	0.4261	KNOWN	0.106	0.068
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.863	1.202
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.856	1.197
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	1.603	1.034
60	34	35	16.0	2800.0	135.0	0.3728	KNOWN	0.830	0.535
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	3.750	2.419
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.382	0.246
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.627	0.404
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.073	0.692
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	6.267	4.043
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.061	0.040
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	7.534	4.861
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.441	1.575
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	16.688	10.766
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.653	1.712
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.021	3.885
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.705	0.455
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.712	2.395
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.305	0.842
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.080	0.697
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.343	1.512
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.377	0.888
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.366	0.881
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.623	0.402
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.977	0.631
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.619	0.399
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE - SLS66
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 47 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	- STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	28.241	18.220		142.0	KNOWN	127.0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	140.0		120.0
3	81	8	0	0	20.0	8.758	5.650	KNOWN	140.0		120.0
4	9	0	0	0	20.0	21.793	14.060	KNOWN	140.3		120.3
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	139.8		99.8
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	138.8		128.8
7	1	0	0	0	45.0	0.697	0.450	KNOWN	143.8		98.8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	138.4		128.4
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	136.7		126.7
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	137.6		127.6
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	136.7		126.7
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	139.4		119.4
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	139.1		119.1
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	139.2		104.2
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	135.1		100.1
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	136.4		121.4
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	135.7		120.7
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	135.2		115.2
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	135.2		120.2
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	134.3		104.3
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	123.9		83.9
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	135.5		125.5
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	125.2		115.2
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	129.2		114.2
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	130.2		120.2
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	126.4		111.4
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	126.6		116.6
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	127.0		117.0
29	65	66	63	71	15.0	0.000	0.000	KNOWN	128.8		113.8
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	128.9		118.9
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	134.4		124.4
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	135.9		125.9
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	129.0		109.0
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	129.1		109.1
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	128.8		118.8
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	128.9		118.9
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	129.3		114.3
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	129.9		114.9
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	129.9		114.9
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	130.3		110.3
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	134.2		99.2
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	132.2		117.2
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	126.0		116.0
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	124.8		109.8
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	124.8		109.8
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	124.8		104.8
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	122.8		62.8
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	120.6		95.6
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	135.4		115.4
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	123.1		53.1
51	38	37	36	0	60.0	0.000	0.000	KNOWN	123.2		63.2
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	119.0		109.0
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	113.4		93.4
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	123.2		103.2
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	125.2		115.2

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	28.241	18.220
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.859	2.490
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	15.742	10.156
7	2	12	48.0	1920.0	135.0	0.0012	KNOWN	27.501	17.743
8	3	5	30.0	1600.0	135.0	0.0100	KNOWN	4.897	3.160
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	21.793	14.060
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.865	0.558
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	24.105	15.551
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	135.0	0.0064	KNOWN	9.444	6.093
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	26.481	17.084
16	8	9	16.0	592.0	135.0	0.0788	KNOWN	5.148	3.321
47	8	18	40.0	3200.0	0.0	99.9999	KNOWN	0.002	0.002
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	20.056	12.939
15	9	11	16.0	4000.0	135.0	0.5326	KNOWN	0.284	0.183
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	20.609	13.296
14	10	11	24.0	2720.0	135.0	0.0503	KNOWN	4.729	3.051
13	12	11	16.0	5120.0	135.0	0.6818	KNOWN	2.114	1.364
28	11	16	24.0	1650.0	135.0	0.0305	KNOWN	3.456	2.229
11	12	13	48.0	1440.0	135.0	0.0009	KNOWN	23.028	14.857
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	13.795	8.900
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	33.785	21.797
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	9.116	5.881
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	0.526	0.339
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	7.689	4.961
75	16	17	30.0	950.0	135.0	0.0059	KNOWN	12.253	7.905
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	22.793	14.705
74	17	19	30.0	1200.0	135.0	0.0075	KNOWN	10.177	6.566
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	20.740	13.380
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.109	0.715
48	49	18	48.0	640.0	135.0	0.0004	KNOWN	24.342	15.704
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	0.677	0.437
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	7.867	5.075
25	19	31	16.0	2000.0	60.0	1.1938	KNOWN	0.797	0.514
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	5.328	3.438
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	1.120	0.722
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.115	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	5.716	3.688
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	18.500	11.936
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	8.553	5.518
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.350	1.516
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	2.320	1.497
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	1.799	1.161
65	24	29	16.0	3360.0	135.0	0.4474	KNOWN	0.962	0.621
64	24	33	36.0	2400.0	135.0	0.0062	KNOWN	7.262	4.685
52	40	24	30.0	4960.0	135.0	0.0309	KNOWN	6.936	4.475
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	3.235	2.087
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.244	0.157
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	3.953	2.550
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	2.259	1.458
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	1.484	0.957
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.899	0.580
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	7.683	4.957
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	5.688	3.669
63	33	29	30.0	800.0	135.0	0.0050	KNOWN	6.814	4.396
71	29	35	16.0	3200.0	135.0	0.4261	KNOWN	0.093	0.060
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.850	1.193
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	1.875	1.210
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	1.629	1.051
60	34	35	16.0	2800.0	135.0	0.3728	KNOWN	0.835	0.539
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	3.782	2.440
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.389	0.251
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	0.629	0.406
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.078	0.695
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	6.302	4.066
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.058	0.037
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	7.561	4.878
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.453	1.583
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	16.761	10.813
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	2.662	1.717
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	6.075	3.919
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	0.759	0.489
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	3.766	2.429
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	1.254	0.809
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.083	0.698
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	2.348	1.515
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.377	0.889
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	1.364	0.880
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.622	0.401
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0.984	0.635
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	0.612	0.395
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE - SLS67
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 5 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28,241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39,385	25,410	KNOWN	139,9		119,9
3	81	8	0	0	20,0	8,758	5,650	KNOWN	139,9		119,9
4	9	0	0	0	20,0	21,793	14,060	KNOWN	140,2		120,2
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	139,7		99,7
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	136,0		126,0
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	135,0		125,0
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	138,6		128,6
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	136,6		126,6
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,3		119,3
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	139,0		119,0
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	139,1		104,1
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	135,0		100,0
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	136,2		121,2
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	135,6		120,6
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,0		115,0
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	135,0		120,0
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	134,1		104,1
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	123,7		83,7
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,2		125,2
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	125,0		115,0
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	129,0		114,0
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	130,0		120,0
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	126,2		111,2
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	126,3		116,3
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	126,8		116,8
29	65	66	63	71	15,0	0,000	0,000	KNOWN	128,6		113,6
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	128,7		118,7
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	134,2		124,2
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	135,6		125,6
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	128,8		108,8
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	128,9		108,9
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	128,6		118,6
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	128,7		118,7
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	129,0		114,0
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	129,7		114,7
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	129,7		114,7
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	130,1		110,1
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,0		99,0
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,0		117,0
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	125,8		115,8
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	124,6		109,6
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	124,6		109,6
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	124,6		104,6
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	122,6		62,6
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	120,4		95,4
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,0		115,0
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	122,9		52,9
51	38	37	36	0	60,0	0,000	0,000	KNOWN	123,0		63,0
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	118,8		108,8
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	113,2		93,2
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	123,0		103,0
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	125,0		115,0

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48.0	800.0	86,0	0,0012	KNOWN	3,661	2,362
6	2	6	48.0	4960.0	86,0	0,0072	KNOWN	15,123	9.757
7	2	12	48.0	1920.0	135,0	0,0012	KNOWN	27,924	18,015
8	3	5	30.0	1600.0	135,0	0,0100	KNOWN	5,096	3,288
9	4	5	48.0	2000.0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,866	0,559
10	5	14	48.0	2080.0	120,0	0,0016	KNOWN	24,303	15,679
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40.0	4160.0	135,0	0,0064	KNOWN	26,308	16,973
4	6	10	48.0	1920.0	86,0	0,0028	KNOWN	9,012	5,814
16	8	9	16.0	592.0	135,0	0,0788	KNOWN	3,985	2,571
47	8	18	40.0	3200.0	135,0	0,0049	KNOWN	18,019	11.625
5	10	9	48.0	2240.0	0,0	99.9999	KNOWN	0,005	0,003
15	11	9	16.0	4000.0	135,0	0,5326	KNOWN	1,796	1,159
46	9	49	48.0	3350.0	85,0	0,0050	KNOWN	1,246	0,804
14	10	11	24.0	2720.0	135,0	0,0503	KNOWN	7,317	4,721
13	12	11	16.0	5120.0	135,0	0,6818	KNOWN	2,101	1,355
28	11	16	24.0	1650.0	135,0	0,0305	KNOWN	4.196	2,707
11	12	13	48.0	1440.0	135,0	0,0009	KNOWN	23,465	15,139
12	14	13	48.0	960.0	120,0	0,0008	KNOWN	13,944	8,996
17	13	16	48.0	5120.0	120,0	0,0040	KNOWN	34,371	22,175
18	14	15	24.0	3680.0	135,0	0,0680	KNOWN	9,165	5,913
19	17	15	16.0	3840.0	63,0	2,0943	KNOWN	0,504	0,325
73	15	20	24.0	1040.0	135,0	0,0192	KNOWN	7,716	4.978
75	16	17	30.0	950.0	135,0	0,0059	KNOWN	12,237	7,895
26	16	32	48.0	1950.0	120,0	0,0015	KNOWN	24,113	15,557
74	17	19	30.0	1200.0	135,0	0,0075	KNOWN	10,183	6,570
45	18	41	48.0	4550.0	120,0	0,0036	KNOWN	20,755	13.390
49	18	42	16.0	5600.0	70,0	2,5133	KNOWN	1,110	0,716
48	49	18	48.0	640.0	135,0	0,0004	KNOWN	6,372	4,111
20	19	20	16.0	3200.0	60,0	1,9101	KNOWN	0,660	0,426
24	19	23	30.0	5600.0	50,0	0,2193	KNOWN	7,872	5,079
25	19	31	16.0	2000.0	60,0	1,1938	KNOWN	0,814	0,525
21	20	21	24.0	6720.0	66,0	0,4668	KNOWN	5,338	3,444
23	23	21	20.0	5120.0	60,0	1,0309	KNOWN	1,110	0,716
22	21	53	20.0	8470.0	70,0	1,2823	KNOWN	3.116	2.010
30	22	25	20.0	1040.0	60.0	0,2094	KNOWN	5,684	3,667
29	32	22	48.0	1920.0	120,0	0.0015	KNOWN	19,837	12,798
44	22	49	48.0	3840.0	120,0	0,0030	KNOWN	9,927	6.405
33	23	46	30.0	4800.0	80,0	0.0788	KNOWN	2,364	1.525
34	23	54	20.0	1760.0	55,0	0,4163	KNOWN	2,321	1,498
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	1,779	1.148
65	24	29	16.0	3360.0	135,0	0.4474	KNOWN	0,961	0,620
64	24	33	36.0	2400.0	135,0	0.0062	KNOWN	7,252	4,679
52	40	24	30.0	4960.0	135,0	0,0309	KNOWN	6,946	4,481
76	25	30	20.0	800.0	63,0	0,1472	KNOWN	3,223	2,079
42	27	26	16.0	3200.0	60,0	1,9101	KNOWN	0,247	0,159
31	30	26	20.0	1600.0	78,0	0,1983	KNOWN	3,943	2,544
32	26	46	20.0	1760.0	60,0	0,3544	KNOWN	2,252	1.453
78	28	27	16.0	450.0	70,0	0.2020	KNOWN	1,485	0,958
77	27	43	16.0	1600.0	70,0	0.7181	KNOWN	0,897	0,579
66	29	28	30.0	2000.0	70,0	0,0420	KNOWN	7,677	4,953
67	28	43	30.0	1920.0	70,0	0,0403	KNOWN	5,682	3,666
63	33	29	30.0	800.0	135,0	0,0050	KNOWN	6,809	4,393
71	29	35	16.0	3200.0	135,0	0,4261	KNOWN	0,092	0,059
82	31	30	16.0	3900.0	70,0	1,7503	KNOWN	1,851	1,194
27	32	31	20.0	1600.0	50,0	0,4514	KNOWN	1,858	1,199
62	34	33	24.0	1920.0	135,0	0.0355	KNOWN	1,634	1.054
60	34	35	16.0	2800.0	135,0	0,3728	KNOWN	0,836	0,539
61	37	34	24.0	880.0	135,0	0.0163	KNOWN	3,787	2,443
59	36	35	16.0	2080.0	80,0	0.7292	KNOWN	0,390	0.252
58	37	36	16.0	2230.0	80,0	0.7818	KNOWN	0,629	0,406
57	39	36	16.0	2400.0	80,0	0,8414	KNOWN	1,078	0,696
56	38	37	30.0	1280.0	80,0	0.0210	KNOWN	6,307	4,069
55	39	38	30.0	560.0	80,0	0,0092	KNOWN	0,060	0,038
53	40	38	30.0	640.0	80,0	0.0105	KNOWN	7,565	4,880
54	42	39	16.0	960.0	70,0	0.4309	KNOWN	2,455	1,584
51	41	40	30.0	1280.0	80,0	0.0210	KNOWN	16,774	10.822
50	41	42	16.0	960.0	80,0	0.3365	KNOWN	2,663	1.718
68	43	55	30.0	1280.0	70,0	0,0269	KNOWN	6,067	3,914
41	44	45	30.0	2720.0	70,0	0,0572	KNOWN	0,751	0,484
69	55	44	30.0	1600.0	70,0	0.0336	KNOWN	3,758	2.424
40	46	45	30.0	1280.0	80,0	0,0210	KNOWN	1.261	0,814
39	45	47	16.0	2400.0	55,0	1,6828	KNOWN	1,082	0,698
38	46	51	20.0	1840.0	63,0	0,3385	KNOWN	2,347	1,514
72	47	48	20.0	5290.0	55,0	1.2512	KNOWN	1,377	0,889
37	51	47	20.0	800.0	55,0	0.1892	KNOWN	1,365	0,880
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0,622	0,401
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	0,983	0,634
79	54	50	20.0	1120.0	55,0	0,2649	KNOWN	0,614	0.396
70	55	52	16.0	3700.0	55,0	2.5943	KNOWN	1,597	1,030

TABLE - SLS68
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 46 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28.241	18,220		142,0	KNOWN	127,0
2	81	6	7	0	20,0	39.385	25.410	KNOWN	140.1		120.1
3	81	8	0	0	20,0	8,758	5,650	KNOWN	140,2		120,2
4	9	0	0	0	20,0	21,793	14,060	KNOWN	140,5		120,5
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	140,0		100,0
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10.0	-4.309	-2,780	KNOWN	137,0		127,0
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	138,2		128,2
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	138,3		128,3
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	137,3		127,3
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	139,6		119,6
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	139,3		119,3
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	139,4		104,4
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	135,4		100,4
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	136,7		121,7
17	19	75	74	0	15,0	-1,550	-1.000	KNOWN	136,1		121,1
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	135,7		115,7
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	135,6		120,6
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	134,6		104,6
21	21	23	22	0	40,0	-3,333	-2.150	KNOWN	124,3		84,3
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	135,9		125,9
23	24	23	33	34	10,0	-2.077	-1,340	KNOWN	125,6		115,6
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	129,7		114,7
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	130,7		120,7
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	126,8		111,8
27	42	78	77	0	10,0	-0.341	-0,220	KNOWN	127,0		117,0
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	127,4		117,4
29	65	66	63	71	15,0	0.000	0,000	KNOWN	129.3		114,3
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	129,4		119,4
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	134,8		124,8
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	136,2		126,2
33	64	63	62	0	20.0	-2,077	-1,340	KNOWN	129,5		109,5
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	129,5		109,5
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	129,3		119,3
36	59	58	57	0	10,0	-1.318	-0,850	KNOWN	129,4		119,4
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	129,7		114,7
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	130,4		115,4
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	130,4		115,4
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	130,8		110,8
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	134,7		99,7
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	132,7		117,7
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	126,4		116,4
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	125,2		110,2
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	125,2		110,2
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	125,2		105,2
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	123,3		63,3
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	121,0		96,0
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	135,7		115,7
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	123,5		53,5
51	38	37	36	0	60.0	0,000	0.000	KNOWN	123,6		63,6
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	119,5		109,5
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	113,8		93,8
54	34	35	79	0	20,0	-1.085	-0.700	KNOWN	123,6		103,6
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	125,6		115,6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0,0067	KNOWN	28,241	18.220
81	3	2	48.0	800.0	86,0	0,0012	KNOWN	4,245	2,739
6	2	6	48.0	4960.0	86,0	0.0072	KNOWN	17,020	10,981
7	2	12	48,0	1920.0	135,0	0,0012	KNOWN	26,611	17,169
8	3	5	30.0	1600.0	135,0	0.0100	KNOWN	4,512	2.911
9	4	5	48.0	2000.0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,861	0,555
10	5	14	48.0	2080.0	120,0	0,0016	KNOWN	23,724	15,306
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0.450
3	6	8	40.0	4160.0	135,0	0.0064	KNOWN	20,571	13,272
4	6	10	48.0	1920.0	86,0	0,0028	KNOWN	16,645	10,739
16	9	8	16.0	592.0	135,0	0,0788	KNOWN	4,186	2,701
47	8	18	40.0	3200.0	135,0	0,0049	KNOWN	20,449	13,193
5	10	9	48.0	2240.0	135,0	0,0014	KNOWN	9,945	6.416
15	9	11	16.0	4000.0	135,0	0,5326	KNOWN	1,298	0.838
46	9	49	48.0	3350.0	0,0	99,9999	KNOWN	0,003	0,002
14	10	11	24.0	2720.0	135,0	0,0503	KNOWN	4,926	3.178
13	12	11	16.0	5120.0	135,0	0,6818	KNOWN	1,937	1,250
28	11	16	24.0	1650.0	135,0	0,0305	KNOWN	4,736	3,055
11	12	13	48.0	1440.0	135,0	0,0009	KNOWN	22,311	14,394
12	14	13	48.0	960.0	120,0	0,0008	KNOWN	13,496	8,707
17	13	16	48.0	5120.0	120,0	0,0040	KNOWN	32,768	21,141
18	14	15	24.0	3680.0	135,0	0,0680	KNOWN	9,035	5,829
19	17	15	16.0	3840.0	63,0	2,0943	KNOWN	0,561	0,362
73	15	20	24.0	1040.0	135,0	0,0192	KNOWN	7,643	4,931
75	16	17	30.0	950.0	135,0	0,0059	KNOWN	12,300	7,936
26	16	32	48.0	1950.0	120,0	0,0015	KNOWN	22,987	14,831
74	17	19	30.0	1200.0	135,0	0,0075	KNOWN	10,189	6,573
45	18	41	48.0	4550.0	120,0	0,0036	KNOWN	20,808	13.425
49	18	42	16.0	5600.0	70,0	2,5133	KNOWN	1,112	0,718
48	49	18	48.0	640.0	135,0	0,0004	KNOWN	3,967	2,560
20	19	20	16.0	3200.0	60,0	1,9101	KNOWN	0,705	0.455
24	19	23	30.0	5600.0	50,0	0,2193	KNOWN	7,853	5,066
25	19	31	16.0	2000.0	60,0	1,1938	KNOWN	0,794	0,512
21	20	21	24.0	6720.0	66,0	0,4668	KNOWN	5,310	3.426
23	23	21	20.0	5120.0	60,0	1,0309	KNOWN	1,138	0,734
22	21	53	20.0	8470.0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20.0	1040.0	60,0	0,2094	KNOWN	5,684	3,667
29	32	22	48.0	1920.0	120,0	0,0015	KNOWN	18,699	12,064
44	22	49	48,0	3840.0	120,0	0,0030	KNOWN	8,784	5,667
33	23	46	30.0	4800.0	80,0	0,0788	KNOWN	2,321	1,497
34	23	54	20.0	1760.0	55,0	0,4163	KNOWN	2,317	1,495
43	25	24	16.0	2560.0	135,0	0,3409	KNOWN	1,764	1.138
65	24	29	16.0	3360.0	135,0	0,4474	KNOWN	0,964	0,622
64	24	33	36.0	2400.0	135,0	0,0062	KNOWN	7,265	4,687
52	40	24	30.0	4960.0	135,0	0,0309	KNOWN	6,976	4,501
76	25	30	20.0	800.0	63,0	0,1472	KNOWN	3,238	2.089
42	27	26	16.0	3200.0	60,0	1,9101	KNOWN	0,253	0,164
31	30	26	20.0	1600.0	78,0	0,1983	KNOWN	3,949	2,548
32	26	46	20.0	1760.0	60,0	0,3544	KNOWN	2,265	1,461
78	28	27	16.0	450.0	70,0	0,2020	KNOWN	1,495	0,965
77	27	43	16.0	1600.0	70,0	0,7181	KNOWN	0,901	0,581
66	29	28	30.0	2000.0	70,0	0,0420	KNOWN	7,719	4,980
67	28	43	30.0	1920.0	70,0	0,0403	KNOWN	5,713	3,686
63	33	29	30.0	800.0	135,0	0,0050	KNOWN	6,839	4,412
71	29	35	16.0	3200.0	135,0	0,4261	KNOWN	0,083	0,054
82	31	30	16.0	3900.0	70,0	1,7503	KNOWN	1,843	1.189
27	32	31	20.0	1600.0	50,0	0,4514	KNOWN	1,870	1,206
62	34	33	24.0	1920.0	135,0	0,0355	KNOWN	1,651	1,065
60	34	35	16.0	2800.0	135,0	0,3728	KNOWN	0,839	0,542
61	37	34	24.0	880.0	135,0	0,0163	KNOWN	3,808	2,457
59	36	35	16.0	2080.0	80,0	0,7292	KNOWN	0,395	0,255
58	37	36	16.0	2230.0	80,0	0,7818	KNOWN	0,630	0,407
57	39	36	16.0	2400.0	80,0	0,8414	KNOWN	1,082	0,698
56	38	37	30.0	1280.0	80,0	0,0210	KNOWN	6,329	4,083
55	39	38	30.0	560.0	80,0	0,0092	KNOWN	0,064	0,042
53	40	38	30.0	640.0	80,0	0,0105	KNOWN	7,582	4.892
54	42	39	16.0	960.0	70,0	0,4309	KNOWN	2,464	1,590
51	41	40	30.0	1280.0	80,0	0,0210	KNOWN	16,822	10,853
50	41	42	16.0	960.0	80,0	0,3365	KNOWN	2,669	1,722
68	43	55	30.0	1280.0	70.0	0,0269	KNOWN	6,102	3,937
41	44	45	30.0	2720.0	70,0	0,0572	KNOWN	0,786	0.507
69	55	44	30.0	1600.0	70,0	0.0336	KNOWN	3,793	2,447
40	46	45	30.0	1280.0	80,0	0,0210	KNOWN	1,228	0,792
39	45	47	16.0	2400.0	55,0	1,6828	KNOWN	1,084	0,699
38	46	51	20.0	1840.0	63,0	0,3385	KNOWN	2,350	1,516
72	47	48	20.0	5290.0	55,0	1.2512	KNOWN	1,377	0,889
37	51	47	20.0	800.0	55,0	0.1892	KNOWN	1,363	0,880
35	54	48	16.0	9100.0	55,0	6.3805	KNOWN	0,622	0.401
36	51	50	20.0	880.0	110,0	0,0577	KNOWN	0,987	0,637
79	54	50	20.0	1120.0	55,0	0,2649	KNOWN	0.610	0.393
70	55	52	16.0	3700.0	55,0	2,5943	KNOWN	1,596	1,030

TABLE - SLS69
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 4 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28.241	18.220		142,0	KNOWN	127,0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	139,3		119,3
3	81	8	0	0	20,0	8.758	5.650	KNOWN	139,3		119,3
4	9	0	0	0	20,0	21.793	14.060	KNOWN	139,4		119,4
5	8	9	80	10	40,0	-1.720	-1,110	KNOWN	138,9		98,9
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0,450	KNOWN	143,8		98,8
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	135,3		125,3
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	133,9		123,9
10	4	5	14	0	10.0	-1,689	-1,090	KNOWN	133,9		123,9
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	134,2		124,2
12	7	80	13	11	20,0	-3.224	-2,080	KNOWN	138,5		118,5
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	138,1		118,1
14	10	12	18	0	35,0	-1.193	-0.770	KNOWN	138,3		103,3
15	18	19	73	0	35,0	-1,953	-1,260	KNOWN	133,8		98,8
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	134,6		119,6
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	134,1		119,1
18	47	45	49	48	20,0	-2.495	-1,610	KNOWN	133,9		113,9
19	74	20	24	25	15,0	-0,837	-0.540	KNOWN	133,6		118,6
20	73	20	21	0	30,0	-3.038	-1,960	KNOWN	133,0		103,0
21	21	23	22	0	40,0	-3.333	-2.150	KNOWN	122,5		82,5
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	134,0		124,0
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	123,7		113,7
24	43	65	64	52	15,0	-0,511	-0.330	KNOWN	127,8		112,8
25	30	43	76	0	10.0	-0.682	-0,440	KNOWN	128,8		118,8
26	42	31	32	0	15,0	-1.938	-1,250	KNOWN	125,0		110,0
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	125,1		115,1
28	78	66	67	0	10,0	-0,511	-0.330	KNOWN	125,5		115,5
29	65	66	63	71	15,0	0.000	0,000	KNOWN	127,4		112,4
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	127,5		117,5
31	25	82	27	0	10,0	-0,821	-0.530	KNOWN	132,8		122,8
32	26	29	27	0	10,0	-2,418	-1.560	KNOWN	134,2		124,2
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	127,6		107,6
34	62	60	61	0	20,0	-1.318	-0.850	KNOWN	127,7		107,7
35	71	60	59	0	10,0	-1.318	-0,850	KNOWN	127,4		117,4
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	127,5		117,5
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	127,9		112,9
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	128,5		113,5
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	128,5		113,5
40	52	53	51	0	20.0	-2,263	-1,460	KNOWN	129,0		109,0
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	132,9		97,9
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	130,8		115,8
43	77	67	68	0	10,0	-0,511	-0.330	KNOWN	124,5		114,5
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	123,4		108,4
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	123,3		108,3
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	123,4		103,4
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	121,4		61,4
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	119,1		94,1
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	133,9		113,9
50	36	79	0	0	70,0	-1.596	-1,030	KNOWN	121,6		51,6
51	38	37	36	0	60,0	0,000	0,000	KNOWN	121,7		61,7
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	117,6		107,6
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	112,0		92,0
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	121,8		101,8
55	68	69	70	0	10,0	-0,713	-0.460	KNOWN	123,8		113,8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67,0	0,0067	KNOWN	28,241	18,220
81	3	2	48,0	800,0	86,0	0,0012	KNOWN	2,094	1,351
6	2	6	48.0	4960.0	86,0	0.0072	KNOWN	9,885	6,377
7	2	12	48.0	1920.0	135,0	0,0012	KNOWN	31,595	20,384
8	3	5	30.0	1600.0	135,0	0,0100	KNOWN	6,663	4,299
9	4	5	48,0	2000,0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,877	0,566
10	5	14	48.0	2080.0	120,0	0,0016	KNOWN	25,859	16,683
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40.0	4160.0	135,0	0,0064	KNOWN	30,075	19,403
4	6	10	48.0	1920.0	0,0	99,9999	KNOWN	0,007	0,004
16	8	9	16.0	592.0	135,0	0,0788	KNOWN	4,695	3,029
47	8	18	40.0	3200.0	135,0	0,0049	KNOWN	21,085	13,603
5	10	9	48.0	2240.0	135,0	0,0014	KNOWN	1,038	0,669
15	11	9	16.0	4000.0	135,0	0,5326	KNOWN	0,763	0,492
46	9	49	48.0	3350.0	135,0	0,0021	KNOWN	1,680	1,084
14	11	10	24.0	2720.0	135,0	0,0503	KNOWN	2,721	1,755
13	12	11	16.0	5120.0	135,0	0,6818	KNOWN	2,712	1,750
28	16	11	24,0	1650,0	135,0	0,0305	KNOWN	4,197	2.707
11	12	13	48.0	1440.0	135,0	0,0009	KNOWN	26,537	17,120
12	14	13	48.0	960.0	120,0	0,0008	KNOWN	15,146	9,771
17	13	16	48,0	5120.0	120,0	0,0040	KNOWN	38,644	24,932
18	14	15	24.0	3680.0	135,0	0,0680	KNOWN	9,520	6.142
19	17	15	16.0	3840.0	63,0	2,0943	KNOWN	0,304	0,196
73	15	20	24.0	1040.0	135,0	0,0192	KNOWN	7,870	5,078
75	16	17	30.0	950.0	135,0	0,0059	KNOWN	11,789	7,606
26	16	32	48.0	1950.0	120,0	0,0015	KNOWN	20,460	13,200
74	17	19	30.0	1200.0	135,0	0,0075	KNOWN	9,935	6,410
45	18	41	48.0	4550.0	120,0	0,0036	KNOWN	20,850	13.452
49	18	42	16.0	5600.0	70,0	2.5133	KNOWN	1,114	0.719
48	49	18	48.0	640.0	135,0	0,0004	KNOWN	3,375	2,177
20	19	20	16.0	3200.0	60,0	1,9101	KNOWN	0,526	0,340
24	19	23	30.0	5600.0	50,0	0,2193	KNOWN	7,794	5.028
25	19	31	16.0	2000.0	60,0	1,1938	KNOWN	0,778	0,502
21	20	21	24.0	6720.0	66,0	0.4668	KNOWN	5,359	3.457
23	23	21	20.0	5120.0	60,0	1,0309	KNOWN	1,089	0,703
22	21	53	20.0	8470.0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20.0	1040.0	60,0	0,2094	KNOWN	5,668	3,657
29	32	22	48.0	1920.0	120,0	0,0015	KNOWN	16,177	10,437
44	22	49	48.0	3840.0	120,0	0,0030	KNOWN	6,274	4,048
33	23	46	30.0	4800.0	80,0	0,0788	KNOWN	2,311	1.491
34	23	54	20.0	1760.0	55,0	0,4163	KNOWN	2,316	1,494
43	25	24	16.0	2560.0	135,0	0,3409	KNOWN	1,738	1,121
65	24	29	16.0	3360.0	135,0	0,4474	KNOWN	0,964	0,622
64	24	33	36.0	2400.0	135,0	0,0062	KNOWN	7,264	4,687
52	40	24	30.0	4960.0	135,0	0,0309	KNOWN	7,001	4,517
76	25	30	20.0	800.0	63,0	0,1472	KNOWN	3,247	2,095
42	27	26	16.0	3200.0	60,0	1,9101	KNOWN	0,261	0,168
31	30	26	20.0	1600.0	78,0	0,1983	KNOWN	3,940	2,542
32	26	46	20.0	1760.0	60,0	0,3544	KNOWN	2,263	1,460
78	28	27	16.0	450.0	70,0	0.2020	KNOWN	1,503	0,969
77	27	43	16.0	1600.0	70,0	0,7181	KNOWN	0,901	0,581
66	29	28	30.0	2000.0	70,0	0,0420	KNOWN	7,741	4.994
67	28	43	30.0	1920.0	70,0	0,0403	KNOWN	5,724	3,693
63	33	29	30.0	800.0	135,0	0,0050	KNOWN	6,852	4,421
71	29	35	16.0	3200.0	135,0	0,4261	KNOWN	0,078	0,050
82	31	30	16.0	3900.0	70,0	1,7503	KNOWN	1,825	1.177
27	32	31	20.0	1600.0	50,0	0,4514	KNOWN	1,868	1,205
62	34	33	24.0	1920.0	135,0	0,0355	KNOWN	1,665	1,074
60	34	35	16.0	2800.0	135,0	0,3728	KNOWN	0,842	0,543
61	37	34	24.0	880.0	135,0	0,0163	KNOWN	3,824	2,467
59	36	35	16.0	2080.0	80,0	0.7292	KNOWN	0,398	0,257
58	37	36	16.0	2230.0	80,0	0,7818	KNOWN	0,631	0,407
57	39	36	16.0	2400.0	80,0	0,8414	KNOWN	1,084	0,699
56	38	37	30.0	1280.0	80,0	0,0210	KNOWN	6,346	4,094
55	39	38	30.0	560.0	80,0	0,0092	KNOWN	0,069	0,044
53	40	38	30.0	640.0	80,0	0,0105	KNOWN	7,595	4,900
54	42	39	16.0	960.0	70,0	0,4309	KNOWN	2,470	1,594
51	41	40	30.0	1280.0	80,0	0,0210	KNOWN	16,856	10,875
50	41	42	16.0	960.0	80,0	0,3365	KNOWN	2,672	1,724
68	43	55	30.0	1280.0	70,0	0,0269	KNOWN	6,113	3,944
41	44	45	30.0	2720.0	70,0	0,0572	KNOWN	0,797	0,514
69	55	44	30.0	1600.0	70,0	0,0336	KNOWN	3,800	2,451
40	46	45	30.0	1280.0	80,0	0,0210	KNOWN	1,217	0,785
39	45	47	16.0	2400.0	55,0	1,6828	KNOWN	1,084	0,699
38	46	51	20.0	1840.0	63,0	0.3385	KNOWN	2,351	1,517
72	47	48	20.0	5290.0	55,0	1,2512	KNOWN	1,377	0,889
37	51	47	20.0	800.0	55,0	0,1892	KNOWN	1,363	0,879
35	54	48	16.0	9100.0	55,0	6,3805	KNOWN	0,622	0,401
36	51	50	20.0	880.0	110,0	0,0577	KNOWN	0,988	0.637
79	54	50	20.0	1120.0	55,0	0,2649	KNOWN	0,609	0,393
70	55	52	16.0	3700.0	55,0	2.5943	KNOWN	1,597	1,030

TABLE - SLS70
STUDY DAY: 2 PM, 1966
REHABILITATION SEQUENCE
PIPE 6 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15,0	28.241	18.220		142,0	KNOWN	127,0
2	81	6	7	0	20.0	39.385	25.410	KNOWN	146,6		126,6
3	81	8	0	0	20.0	8.758	5.650	KNOWN	146,6		126,6
4	9	0	0	0	20,0	21,793	14,060	KNOWN	146,5		126,5
5	8	9	80	10	40,0	-1,720	-1,110	KNOWN	146,0		106,0
6	2	6	1	3	10,0	-8,742	-5,640	KNOWN	138,8		128,8
7	1	0	0	0	45,0	0,697	0.450	KNOWN	143,8		98,8
8	3	16	47	0	10,0	-4,309	-2,780	KNOWN	138,4		128,4
9	16	5	15	46	10,0	-4,541	-2,930	KNOWN	138,5		128,5
10	4	5	14	0	10,0	-1,689	-1,090	KNOWN	138,7		128,7
11	15	14	13	28	10,0	-3,426	-2,210	KNOWN	139,3		129,3
12	7	80	13	11	20,0	-3,224	-2,080	KNOWN	145,6		125,6
13	11	12	17	0	20,0	-3,038	-1,960	KNOWN	145,0		125,0
14	10	12	18	0	35,0	-1,193	-0,770	KNOWN	145,2		110,2
15	18	19	73	0	35,0	-1,953	-1.260	KNOWN	139,8		104,8
16	28	17	75	26	15,0	-2,216	-1,430	KNOWN	140,0		125,0
17	19	75	74	0	15,0	-1,550	-1,000	KNOWN	139,5		124,5
18	47	45	49	48	20,0	-2,495	-1,610	KNOWN	138,3		118,3
19	74	20	24	25	15,0	-0,837	-0,540	KNOWN	139,0		124,0
20	73	20	21	0	30,0	-3,038	-1,960	KNOWN	138,8		108,8
21	21	23	22	0	40,0	-3,333	-2,150	KNOWN	127,8		87,8
22	30	29	44	0	10,0	-4,231	-2,730	KNOWN	138,7		128,7
23	24	23	33	34	10,0	-2,077	-1,340	KNOWN	128,8		118,8
24	43	65	64	52	15,0	-0,511	-0,330	KNOWN	132,4		117,4
25	30	43	76	0	10,0	-0,682	-0,440	KNOWN	133,5		123,5
26	42	31	32	0	15,0	-1,938	-1,250	KNOWN	129,8		114,8
27	42	78	77	0	10,0	-0,341	-0,220	KNOWN	129,9		119,9
28	78	66	67	0	10,0	-0,511	-0,330	KNOWN	130,3		120,3
29	65	66	63	71	15,0	0,000	0,000	KNOWN	132,0		117,0
30	76	31	82	0	10,0	-1,131	-0,730	KNOWN	132,3		122,3
31	25	82	27	0	10,0	-0,821	-0,530	KNOWN	138,0		128,0
32	26	29	27	0	10,0	-2,418	-1,560	KNOWN	139,3		129,3
33	64	63	62	0	20,0	-2,077	-1,340	KNOWN	132,2		112,2
34	62	60	61	0	20,0	-1,318	-0,850	KNOWN	132,3		112,3
35	71	60	59	0	10,0	-1,318	-0,850	KNOWN	132,0		122,0
36	59	58	57	0	10,0	-1,318	-0,850	KNOWN	132,1		122,1
37	61	58	56	0	15,0	-1,891	-1,220	KNOWN	132,5		117,5
38	56	55	53	0	15,0	-1,318	-0,850	KNOWN	133,1		118,1
39	57	55	54	0	15,0	-1,318	-0,850	KNOWN	133,1		118,1
40	52	53	51	0	20,0	-2,263	-1,460	KNOWN	133,5		113,5
41	45	51	50	0	35,0	-1,318	-0,850	KNOWN	137,3		102,3
42	49	54	50	0	15,0	-1,318	-0,850	KNOWN	135,3		120,3
43	77	67	68	0	10,0	-0,511	-0,330	KNOWN	129,4		119,4
44	41	69	0	0	15,0	-3,007	-1,940	KNOWN	128,3		113,3
45	41	40	39	0	15,0	-0,930	-0,600	KNOWN	128,3		113,3
46	33	32	40	38	20,0	-1,007	-0,650	KNOWN	128,3		108,3
47	39	72	37	0	60,0	-1,069	-0,690	KNOWN	126,3		66,3
48	72	35	0	0	25,0	-1,999	-1,290	KNOWN	124,1		99,1
49	46	48	44	0	20,0	-4,820	-3,110	KNOWN	138,4		118,4
50	36	79	0	0	70,0	-1,596	-1,030	KNOWN	126,6		56,6
51	38	37	36	0	60,0	0,000	0,000	KNOWN	126,7		66,7
52	70	0	0	0	10,0	-1,596	-1,030	KNOWN	122,5		112,5
53	22	0	0	0	20,0	-3,115	-2,010	KNOWN	117,3		97,3
54	34	35	79	0	20,0	-1,085	-0,700	KNOWN	126,7		106,7
55	68	69	70	0	10,0	-0,713	-0,460	KNOWN	128,6		118,6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67,0	0,0067	KNOWN	28,241	18,220
81	2	3	48.0	800.0	86,0	0,0012	KNOWN	0,872	0,562
6	2	6	48.0	4960.0	0,0	99,9999	KNOWN	0,005	0,003
7	2	12	48,0	1920.0	135,0	0,0012	KNOWN	38,589	24,044
8	3	5	30.0	1600.0	135,0	0,0100	KNOWN	9,629	6,212
9	4	5	48.0	2000.0	120,0	0,0016	KNOWN	21,793	14,060
80	5	12	16.0	1280.0	75,0	0,5056	KNOWN	0,864	0,557
10	5	14	48.0	2080.0	120,0	0,0016	KNOWN	28,838	18,605
1	7	6	16.0	11700.0	50,0	9,7854	KNOWN	0,698	0,450
3	6	8	40.0	4160.0	135,0	0,0064	KNOWN	8,998	5,805
4	6	10	48.0	1920.0	135,0	0,0012	KNOWN	11,182	7,214
16	9	8	16.0	592.0	135,0	0,0788	KNOWN	1,081	0,697
47	8	18	40.0	3200.0	135,0	0,0049	KNOWN	5,767	3,720
5	10	9	48.0	2240.0	135,0	0,0014	KNOWN	13,544	8,738
15	11	9	16.0	4000.0	135,0	0,5326	KNOWN	1,280	0,826
46	9	49	48.0	3350.0	135,0	0,0021	KNOWN	9,201	5,936
14	11	10	24.0	2720.0	135,0	0,0503	KNOWN	4,031	2,600
13	12	11	16.0	5120.0	135,0	0,6818	KNOWN	3,317	2,140
28	16	11	24.0	1650.0	135,0	0,0305	KNOWN	5,419	3,496
11	12	13	48.0	1440.0	135,0	0,0009	KNOWN	32,832	21,182
12	14	13	48.0	960.0	120,0	0,0008	KNOWN	17,061	11,007
17	13	16	48.0	5120.0	120,0	0,0040	KNOWN	46,855	30,229
18	14	15	24.0	3680.0	135,0	0.0680	KNOWN	10,584	6,828
19	15	17	16.0	3840.0	63,0	2,0943	KNOWN	0,341	0,220
73	15	20	24.0	1040.0	135,0	0,0192	KNOWN	8,289	5,348
75	16	17	30.0	950.0	135,0	0,0059	KNOWN	11,175	7,210
26	16	32	48.0	1950.0	120,0	0,0015	KNOWN	28,044	18,093
74	17	19	30.0	1200.0	135,0	0,0075	KNOWN	9,966	6,430
45	18	41	48.0	4550.0	120,0	0.0036	KNOWN	20,476	13,210
49	18	42	16.0	5600.0	70,0	2,5133	KNOWN	1,096	0,707
48	49	18	48.0	640.0	135,0	0,0004	KNOWN	18,297	11,804
20	19	20	16.0	3200.0	60,0	1,9101	KNOWN	0,254	0,164
24	19	23	30.0	5600.0	50,0	0,2193	KNOWN	7,958	5,134
25	19	31	16.0	2000.0	60,0	1,1938	KNOWN	0,918	0,592
21	20	21	24.0	6720.0	66,0	0,4668	KNOWN	5,505	3,552
23	23	21	20.0	5120.0	60,0	1,0309	KNOWN	0,943	0,608
22	21	53	20.0	8470.0	70,0	1,2823	KNOWN	3,116	2,010
30	22	25	20.0	1040.0	60,0	0,2094	KNOWN	5,687	3,669
29	32	22	48.0	1920.0	120,0	0,0015	KNOWN	23,835	15,377
44	22	49	48.0	3840.0	120,0	0,0030	KNOWN	13,916	8,978
33	23	46	30.0	4800.0	80,0	0,0788	KNOWN	2,592	1,672
34	23	54	20.0	1760.0	55,0	0,4163	KNOWN	2,346	1,514
43	25	24	16.0	2560.0	135,0	0,3409	KNOWN	1,853	1,195
65	24	29	16.0	3360.0	135,0	0,4474	KNOWN	0,946	0,610
64	24	33	36.0	2400.0	135,0	0,0062	KNOWN	7,184	4,635
52	40	24	30.0	4960.0	135,0	0,0309	KNOWN	6,789	4,380
76	25	30	20.0	800.0	63,0	0,1472	KNOWN	3,152	2,034
42	27	26	16.0	3200.0	60,0	1,9101	KNOWN	0,212	0,137
31	30	26	20.0	1600.0	78,0	0,1983	KNOWN	3,908	2,521
32	26	46	20.0	1760.0	60,0	0,3544	KNOWN	2,183	1,409
78	28	27	16.0	450.0	70,0	0,2020	KNOWN	1,430	0,923
77	27	43	16.0	1600.0	70,0	0,7181	KNOWN	0,876	0,565
66	29	28	30.0	2000.0	70,0	0,0420	KNOWN	7,460	4,813
67	28	43	30.0	1920.0	70,0	0,0403	KNOWN	5,519	3,560
63	33	29	30.0	800.0	135,0	0,0050	KNOWN	6,649	4,290
71	29	35	16.0	3200.0	135,0	0,4261	KNOWN	0,135	0,087
82	31	30	16.0	3900.0	70,0	1,7503	KNOWN	1,888	1,218
27	32	31	20.0	1600.0	50,0	0,4514	KNOWN	1,791	1,156
62	34	33	24.0	1920.0	135,0	0,0355	KNOWN	1,542	0,995
60	34	35	16.0	2800.0	135,0	0,3728	KNOWN	0,817	0,527
61	37	34	24.0	880.0	135,0	0,0163	KNOWN	3,677	2,372
59	36	35	16.0	2080.0	80,0	0,7292	KNOWN	0,366	0,236
58	37	36	16.0	2230.0	80,0	0,7818	KNOWN	0,622	0,401
57	39	36	16.0	2400.0	80,0	0,8414	KNOWN	1,061	0,685
56	38	37	30.0	1280.0	80,0	0,0210	KNOWN	6,190	3,993
55	39	38	30.0	560.0	80,0	0,0092	KNOWN	0,034	0,022
53	40	38	30.0	640.0	80,0	0,0105	KNOWN	7,473	4,821
54	42	39	16.0	960.0	70,0	0,4309	KNOWN	2,412	1,556
51	41	40	30.0	1280.0	80,0	0,0210	KNOWN	16,525	10,661
50	41	42	16.0	960.0	80,0	0,3365	KNOWN	2,633	1,699
68	43	55	30.0	1280.0	70,0	0,0269	KNOWN	5,883	3,796
41	44	45	30.0	2720.0	70,0	0,0572	KNOWN	0,567	0,366
69	55	44	30.0	1600.0	70,0	0,0336	KNOWN	3,574	2,306
40	46	45	30.0	1280.0	80,0	0,0210	KNOWN	1,437	0,927
39	45	47	16.0	2400.0	55,0	1,6828	KNOWN	1,074	0,693
38	46	51	20.0	1840.0	63,0	0,3385	KNOWN	2,330	1,503
72	47	48	20.0	5290.0	55,0	1,2512	KNOWN	1,376	0,888
37	51	47	20.0	800.0	55,0	0,1892	KNOWN	1,372	0,885
35	54	48	16.0	9100.0	55,0	6,3805	KNOWN	0,624	0,402
36	51	50	20.0	880.0	110,0	0,0577	KNOWN	0,959	0,619
79	54	50	20.0	1120.0	55,0	0,2649	KNOWN	0,638	0,411
70	55	52	16.0	3700.0	55,0	2.5943	KNOWN	1,597	1,030

Boston Water

APPENDIX SLS4

RECOMMENDED ORDER OF
IMPROVEMENT TO SLS

(In Report After Page SLS5)

Charles A. Maguire & Associates

Boston Hartford Providence

Boston Water

APPENDIX SLS5

REHABILITATION: YEAR 2020

Charles A. Maguire & Associates

Boston Hartford Providence

TABLE SLS-72
STUDY DAY: YEAR 2020
FIRST STAGE OF REHABILITATION

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H_2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	49.823	32.144		160.0	KNOWN	145.0
2	81	6	7	0	20.0	81.959	52.877		158.5	KNOWN	138.5
3	81	8	0	0	20.0	13.279	8.567		158.5	KNOWN	138.5
4	9	0	0	0	20.0	50.815	32.784		157.9	KNOWN	137.9
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	155.6		115.6
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	150.7		140.7
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	79.8		34.8
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	142.3		132.3
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	142.9		132.9
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	146.7		136.7
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	141.2		131.2
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	154.4		134.4
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	152.1		132.1
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	152.8		117.8
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	116.7		81.7
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	141.4		126.4
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	134.7		119.7
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	138.7		118.7
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	129.4		114.4
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	107.0		77.0
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	57.1		17.1
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	139.1		129.1
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	91.0		81.0
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	115.9		100.9
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	123.1		113.1
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	100.8		85.8
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	100.7		90.7
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	102.1		92.1
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	110.6		95.6
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	116.2		106.2
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	129.7		119.7
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	140.0		130.0
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	113.7		93.7
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	116.1		96.1
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	113.4		103.4
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	116.4		106.4
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	118.7		103.7
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	121.4		106.4
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	121.4		106.4
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	123.2		103.2
41	45	51	50	0	35.0	-2.247	-1.450	KNOWN	135.6		100.6
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	129.1		114.1
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	97.1		87.1
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	91.1		76.1
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	91.0		76.0
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	91.1		71.1
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	77.9		17.9
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	67.5		42.5
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	139.1		119.1
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	78.8		8.8
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	78.9		18.9
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	64.4		54.4
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	-21.3		-41.3
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	79.8		59.8
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	93.2		83.2

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	49.822	32.144
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.017	1.946
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	43.309	27.941
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	41.666	26.881
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	10.262	6.620
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	50.815	32.784
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.609	1.038
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	56.414	36.396
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	24.057	15.520
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	51.218	33.044
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.873	0.563
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	17.552	11.324
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	45.040	29.058
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.555	0.358
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	35.850	23.129
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	3.264	2.106
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.471	0.949
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.585	0.377
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	36.038	23.250
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	40.015	25.816
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	70.658	45.586
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	14.260	9.200
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	3.195	2.061
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	14.077	9.082
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	26.370	17.013
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	39.917	25.753
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	20.509	13.232
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	38.512	24.846
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	2.057	1.327
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	27.254	17.583
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	3.777	2.437
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	16.268	10.496
25	31	19	16.0	2000.0	135.0	0.2663	KNOWN	0.977	0.631
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	12.460	8.039
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	6.590	4.251
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.222	5.950
30	22	25	20.0	1040.0	135.0	0.0467	KNOWN	23.426	15.114
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	30.354	19.583
44	49	22	48.0	3840.0	120.0	0.0030	KNOWN	0.473	0.305
33	46	23	30.0	4800.0	135.0	0.0299	KNOWN	1.612	1.040
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	5.927	3.824
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	5.174	3.338
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	1.403	0.905
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	14.241	9.188
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	11.354	7.325
76	25	30	20.0	800.0	135.0	0.0359	KNOWN	17.075	11.016
42	26	27	16.0	3200.0	135.0	0.4261	KNOWN	0.283	0.182
31	30	26	20.0	1600.0	135.0	0.0719	KNOWN	18.149	11.709
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	13.418	8.657
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	2.873	1.854
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	2.381	1.536
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	17.572	11.337
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	13.505	8.713
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	15.389	9.928
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	1.632	1.053
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	3.012	1.943
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	5.415	3.493
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	4.712	3.040
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.723	1.111
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	8.682	5.602
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	2.157	1.392
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.792	1.156
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.613	1.686
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	13.713	8.847
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.115	0.074
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	16.077	10.372
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	4.745	3.062
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	31.322	20.208
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	4.936	3.184
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	14.692	9.479
41	44	45	30.0	2720.0	135.0	0.0170	KNOWN	2.525	1.629
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	9.376	6.049
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	2.617	1.688
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	3.034	1.957
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	6.911	4.459
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	3.134	2.022
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	2.519	1.625
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	1.423	0.918
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.649	1.064
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	2.025	1.306
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.673	2.370

TABLE SLS-73
STUDY DAY: YEAR 2020
SECOND STAGE OF REHABILITATION

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H_2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	49.508	31.941		160.0	KNOWN	145.0
2	81	6	7	0	20.0	81.883	52.828		158.5	KNOWN	138.5
3	81	8	0	0	20.0	13.332	8.601		158.5	KNOWN	138.5
4	9	0	0	0	20.0	51.151	33.000		157.9	KNOWN	137.9
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	155.6		115.6
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	150.9		140.9
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	79.9		34.9
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	142.6		132.6
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	143.1		133.1
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	146.8		136.8
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	141.0		131.0
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	154.4		134.4
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	152.0		132.0
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	152.7		117.7
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	116.8		81.8
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	141.1		126.1
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	131.6		116.6
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	139.1		119.1
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	123.1		108.1
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	107.5		77.5
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	65.0		25.0
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	139.4		129.4
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	109.2		99.2
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	120.9		105.9
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	127.0		117.0
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	112.4		97.4
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	111.8		101.8
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	111.9		101.9
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	117.2		102.2
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	122.0		112.0
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	125.8		115.8
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	140.0		130.0
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	119.2		99.2
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	120.6		100.6
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	118.4		108.4
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	120.5		110.5
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	122.5		107.5
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	124.7		109.7
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	124.7		109.7
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	126.2		106.2
41	45	51	50	0	35.0	-2.247	-1.450	KNOWN	136.5		101.5
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	130.9		115.9
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	110.9		100.9
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	108.1		93.1
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	108.1		93.1
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	108.3		88.3
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	95.4		35.4
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	85.1		60.1
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	139.4		119.4
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	96.3		26.3
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	96.5		36.5
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	79.5		69.5
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	-13.5		-33.5
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	97.4		77.4
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	108.4		98.4

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	49.508	31.941
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.017	1.946
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	42.982	27.731
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	41.917	27.043
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	10.315	6.655
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	51.151	33.001
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.621	1.046
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	56.791	36.639
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	23.774	15.338
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	50.860	32.813
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.825	0.532
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	17.221	11.111
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	44.576	28.759
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.623	0.402
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	35.363	22.815
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	3.370	2.174
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.478	0.954
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.403	0.260
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	36.294	23.415
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	40.422	26.079
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	71.322	46.014
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	14.230	9.181
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	2.875	1.855
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	13.726	8.855
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	31.960	20.619
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	35.162	22.685
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	26.419	17.044
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	35.129	22.664
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.896	1.223
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	24.071	15.530
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	3.105	2.003
24	19	23	30.0	5600.0	135.0	0.0349	KNOWN	25.354	16.357
25	31	19	16.0	2000.0	135.0	0.2663	KNOWN	3.482	2.247
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	11.437	7.379
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	7.612	4.911
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.223	5.950
30	22	25	20.0	1040.0	135.0	0.0467	KNOWN	20.389	13.154
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	24.586	15.862
44	49	22	48.0	3840.0	120.0	0.0030	KNOWN	3.052	1.969
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	6.304	4.067
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	6.075	3.919
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	4.752	3.066
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	1.158	0.747
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	12.295	7.932
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	9.582	6.182
76	25	30	20.0	800.0	135.0	0.0359	KNOWN	14.445	9.319
42	26	27	16.0	3200.0	135.0	0.4261	KNOWN	1.197	0.772
31	30	26	20.0	1600.0	135.0	0.0719	KNOWN	14.044	9.061
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	8.397	5.417
78	28	27	16.0	450.0	135.0	0.0599	KNOWN	1.561	1.007
77	27	43	16.0	1600.0	135.0	0.2131	KNOWN	2.092	1.349
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	13.614	8.783
67	28	43	30.0	1920.0	135.0	0.0120	KNOWN	10.745	6.932
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	12.252	7.904
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	1.057	0.682
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.529	0.987
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	6.437	4.153
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	3.522	2.272
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.534	0.989
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	7.304	4.712
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.770	1.142
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.654	1.067
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.364	1.525
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	12.197	7.869
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.392	0.253
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	14.836	9.572
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	4.220	2.723
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	28.308	18.263
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	4.571	2.949
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	11.651	7.516
41	45	44	30.0	2720.0	135.0	0.0170	KNOWN	0.787	0.508
69	55	44	30.0	1600.0	135.0	0.0100	KNOWN	6.329	4.083
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	5.606	3.617
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	2.981	1.923
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	6.816	4.398
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	3.126	2.017
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	2.563	1.653
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	1.431	0.923
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.510	0.974
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	2.164	1.396
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.673	2.370

TABLE SLS-74
STUDY DAY: YEAR 2020
THIRD STAGE OF REHABILITATION

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	49.699	32.064		160.0	KNOWN	145.0
2	81	6	7	0	20.0	81.990	52.897		158.5	KNOWN	138.5
3	81	8	0	0	20.0	13.291	8.575		158.5	KNOWN	138.5
4	9	0	0	0	20.0	50.893	32.834		157.9	KNOWN	137.9
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	155.6		115.6
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	150.8		140.8
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	79.9		34.9
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	142.4		132.4
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	143.0		133.0
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	146.7		136.7
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	140.9		130.9
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	154.4		134.4
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	152.0		132.0
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	152.7		117.7
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	121.2		86.2
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	141.0		126.0
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	131.4		116.4
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	138.9		118.9
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	122.6		107.6
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	113.7		83.7
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	101.3		61.3
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	139.2		129.2
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	109.9		99.9
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	119.7		104.7
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	126.9		116.9
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	113.5		98.5
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	113.4		103.4
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	113.7		103.7
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	115.5		100.5
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	122.2		112.2
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	125.5		115.5
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	139.8		129.8
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	117.8		97.8
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	119.3		99.3
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	116.5		106.5
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	119.2		109.2
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	121.4		106.4
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	123.7		108.7
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	123.7		108.7
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	125.4		105.4
41	45	51	50	0	35.0	-2.247	-1.450	KNOWN	136.2		101.2
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	130.3		115.3
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	112.6		102.6
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	109.4		94.4
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	109.4		94.4
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	109.4		89.4
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	105.9		45.9
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	104.0		79.0
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	139.3		119.3
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	106.3		36.3
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	106.3		46.3
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	80.9		70.9
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	22.9		2.9
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	106.8		86.8
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	109.7		99.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	49.699	32.064
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.017	1.946
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	43.181	27.858
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	41.826	26.985
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	10.274	6.629
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	50.893	32.834
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.625	1.048
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	56.489	36.445
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	23.910	15.426
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	51.113	32.976
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.835	0.539
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	17.367	11.205
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	44.822	28.917
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.621	0.400
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	35.601	22.968
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	3.377	2.179
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.487	0.959
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.390	0.251
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	36.198	23.354
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	41.080	26.503
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	71.885	46.377
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	13.270	8.561
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	2.353	1.518
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	12.243	7.899
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	32.051	20.678
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	35.646	22.997
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	27.033	17.441
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	36.014	23.235
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.940	1.251
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	24.865	16.042
20	19	20	16.0	3200.0	135.0	0.4261	KNOWN	5.146	3.320
24	19	23	30.0	5600.0	135.0	0.0349	KNOWN	24.094	15.545
25	31	19	16.0	2000.0	135.0	0.2663	KNOWN	3.650	2.355
21	20	21	24.0	6720.0	135.0	0.1242	KNOWN	11.995	7.739
23	23	21	20.0	5120.0	135.0	0.2300	KNOWN	7.054	4.551
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.222	5.950
30	22	25	20.0	1040.0	135.0	0.0467	KNOWN	20.286	13.088
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	25.034	16.151
44	49	22	48.0	3840.0	120.0	0.0030	KNOWN	2.505	1.616
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	4.395	2.835
34	23	54	20.0	1760.0	135.0	0.0791	KNOWN	7.292	4.704
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	5.213	3.363
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	1.232	0.795
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	13.008	8.392
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	9.906	6.391
76	25	30	20.0	800.0	135.0	0.0359	KNOWN	13.895	8.964
42	26	27	16.0	3200.0	135.0	0.4261	KNOWN	0.514	0.332
31	30	26	20.0	1600.0	135.0	0.0719	KNOWN	13.354	8.616
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	8.394	5.415
78	28	27	16.0	450.0	135.0	0.0599	KNOWN	2.324	1.499
77	27	43	16.0	1600.0	135.0	0.2131	KNOWN	2.063	1.331
66	29	28	30.0	2000.0	135.0	0.0125	KNOWN	15.005	9.680
67	28	43	30.0	1920.0	135.0	0.0120	KNOWN	11.487	7.411
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	13.090	8.445
71	35	29	16.0	3200.0	135.0	0.4261	KNOWN	1.536	0.991
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.397	0.901
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	6.473	4.176
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	3.651	2.355
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.769	1.141
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	7.665	4.945
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	2.015	1.300
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.770	1.142
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.493	1.608
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	12.675	8.177
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.377	0.243
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	15.299	9.870
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	4.363	2.815
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	29.096	18.771
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	4.671	3.014
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	12.357	7.972
41	44	45	30.0	2720.0	135.0	0.0170	KNOWN	0.260	0.168
69	55	44	30.0	1600.0	135.0	0.0100	KNOWN	7.041	4.542
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	3.405	2.197
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.484	0.957
38	46	51	20.0	1840.0	135.0	0.0826	KNOWN	7.098	4.579
72	47	48	20.0	5290.0	135.0	0.2376	KNOWN	3.007	1.940
37	51	47	20.0	800.0	135.0	0.0359	KNOWN	3.941	2.543
35	54	48	16.0	9100.0	135.0	1.2117	KNOWN	1.550	1.000
36	51	50	20.0	880.0	135.0	0.0395	KNOWN	0.170	0.110
79	54	50	20.0	1120.0	135.0	0.0503	KNOWN	3.260	2.103
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.673	2.370

TABLE SLS-75
STUDY DAY: YEAR 2020
FOURTH STAGE OF REHABILITATION

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	48.570	31.335		160.0	KNOWN	145.0
2	81	6	7	0	20.0	81.288	52.444		158.5	KNOWN	138.5
3	81	8	0	0	20.0	13.543	8.738		158.5	KNOWN	138.5
4	9	0	0	0	20.0	52.474	33.854		157.9	KNOWN	137.9
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	155.5		115.5
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	151.2		141.2
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	80.3		35.3
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	143.3		133.3
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	143.8		133.8
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	147.3		137.3
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	141.9		131.9
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	154.3		134.3
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	151.9		131.9
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	152.4		117.4
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	134.5		99.5
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	142.1		127.1
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	135.9		120.9
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	140.0		120.0
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	130.4		115.4
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	130.1		100.1
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	113.6		73.6
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	140.4		130.4
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	118.2		108.2
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	124.3		109.3
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	131.5		121.5
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	120.8		105.8
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	120.7		110.7
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	121.0		111.0
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	122.6		107.6
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	128.7		118.7
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	135.4		125.4
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	140.9		130.9
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	123.3		103.3
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	123.6		103.6
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	122.7		112.7
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	123.1		113.1
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	124.1		109.1
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	125.8		110.8
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	125.8		110.8
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	127.1		107.1
41	45	51	50	0	35.0	-2.247	-1.450	KNOWN	137.4		102.4
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	131.9		116.9
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	120.0		110.0
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	117.2		102.2
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	117.3		102.3
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	117.4		97.4
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	113.9		53.9
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	112.1		87.1
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	140.4		120.4
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	114.4		44.4
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	114.4		54.4
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	88.7		78.7
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	35.1		15.1
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	114.9		94.9
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	117.5		107.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	48.570	31.335
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.017	1.946
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	42.005	27.100
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	42.300	27.290
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	10.527	6.791
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	52.473	33.854
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.592	1.027
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	58.355	37.648
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	23.192	14.963
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	49.527	31.953
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.831	0.536
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	16.644	10.738
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	43.366	27.978
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.590	0.380
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	34.181	22.052
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	3.247	2.095
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.419	0.916
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.619	0.400
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	36.707	23.682
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	35.906	23.165
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	67.218	43.367
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	20.310	13.103
19	17	15	16.0	3840.0	135.0	0.5113	KNOWN	1.739	1.122
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	18.670	12.045
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	25.366	16.365
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	37.436	24.152
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	20.961	13.523
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	35.190	22.703
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.885	1.216
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	24.708	15.941
20	19	20	16.0	3200.0	135.0	0.4261	KNOWN	0.756	0.488
24	19	23	30.0	5600.0	135.0	0.0349	KNOWN	23.663	15.266
25	31	19	16.0	2000.0	135.0	0.2663	KNOWN	4.901	3.162
21	20	21	24.0	6720.0	135.0	0.1242	KNOWN	14.033	9.054
23	23	21	20.0	5120.0	135.0	0.2300	KNOWN	5.017	3.237
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.223	5.950
30	22	25	20.0	1040.0	135.0	0.0467	KNOWN	16.964	10.945
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	22.990	14.832
44	49	22	48.0	3840.0	120.0	0.0030	KNOWN	1.242	0.801
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	5.813	3.750
34	23	54	20.0	1760.0	135.0	0.0791	KNOWN	7.478	4.824
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	5.219	3.367
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	0.739	0.477
64	24	33	36.0	2400.0	135.0	0.0062	KNOWN	15.010	9.684
52	40	24	30.0	4960.0	135.0	0.0309	KNOWN	11.406	7.359
76	25	30	20.0	800.0	135.0	0.0359	KNOWN	10.567	6.817
42	26	27	16.0	3200.0	135.0	0.4261	KNOWN	0.494	0.318
31	30	26	20.0	1600.0	135.0	0.0719	KNOWN	12.626	8.146
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	7.683	4.957
78	28	27	16.0	450.0	135.0	0.0599	KNOWN	2.200	1.419
77	27	43	16.0	1600.0	135.0	0.2131	KNOWN	1.919	1.238
66	29	28	30.0	2000.0	135.0	0.0125	KNOWN	14.127	9.114
67	28	43	30.0	1920.0	135.0	0.0120	KNOWN	10.733	6.925
63	33	29	30.0	800.0	135.0	0.0050	KNOWN	14.164	9.138
71	35	29	16.0	3200.0	135.0	0.4261	KNOWN	0.279	0.180
82	31	30	16.0	3900.0	135.0	0.5193	KNOWN	3.995	2.577
27	32	31	20.0	1600.0	135.0	0.0719	KNOWN	10.322	6.659
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	2.719	1.754
60	34	35	16.0	2800.0	135.0	0.3728	KNOWN	1.572	1.014
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	6.540	4.219
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.751	0.484
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.117	0.721
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	1.880	1.213
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	10.881	7.020
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.084	0.054
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	13.117	8.462
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	4.165	2.687
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	28.415	18.332
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	4.528	2.921
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	11.459	7.393
41	45	44	30.0	2720.0	135.0	0.0170	KNOWN	0.709	0.457
69	55	44	30.0	1600.0	135.0	0.0100	KNOWN	6.142	3.963
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	4.264	2.751
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.447	0.934
38	46	51	20.0	1840.0	135.0	0.0826	KNOWN	6.948	4.483
72	47	48	20.0	5290.0	135.0	0.2376	KNOWN	2.996	1.933
37	51	47	20.0	800.0	135.0	0.0359	KNOWN	3.866	2.558
35	54	48	16.0	9100.0	135.0	1.2117	KNOWN	1.561	1.007
36	51	50	20.0	880.0	135.0	0.0395	KNOWN	0.238	0.154
79	54	50	20.0	1120.0	135.0	0.0503	KNOWN	3.435	2.216
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.673	2.370

Boston Water

APPENDIX SLS6

ANALYSIS: YEAR 2020

Charles A. Maguire & Associates

Boston Hartford Providence

Boston Water

APPENDIX SLS6

ANALYSIS: YEAR 2020

Charles A. Maguire & Associates

Boston Hartford Providence

TABLE SLS-76
STUDY DAY: YEAR 2020
UNIMPROVED NETWORK
INPUT @ 160 FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	49.584	31.990		160.0	KNOWN	145.0
2	81	6	7	0	20.0	81.862	52.814		158.5	KNOWN	138.5
3	81	8	0	0	20.0	13.324	8.596		158.5	KNOWN	138.5
4	9	0	0	0	20.0	51.103	32.970		157.9	KNOWN	137.9
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	155.6		115.6
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	150.8		140.8
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	79.9		34.9
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	142.4		132.4
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	143.1		133.1
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	146.8		136.8
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	141.2		131.2
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	154.4		134.4
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	152.0		132.0
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	152.7		117.7
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	113.7		78.7
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	141.4		126.4
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	133.1		118.1
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	138.8		118.8
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	126.2		111.2
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	103.1		73.1
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	47.1		7.1
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	139.5		129.5
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	73.8		63.8
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	107.2		92.2
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	114.7		104.7
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	87.3		72.3
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	87.4		77.4
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	89.6		79.6
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	101.0		86.0
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	105.3		95.3
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	127.0		117.0
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	140.2		130.2
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	104.9		84.9
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	109.3		89.3
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	106.1		96.1
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	110.5		100.5
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	113.1		98.1
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	116.6		101.6
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	116.6		101.6
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	118.8		98.8
41	45	51	50	0	35.0	-2.247	-1.450	KNOWN	134.9		99.9
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	127.0		112.0
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	83.0		73.0
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	74.6		59.6
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	73.5		58.5
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	73.5		53.5
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	60.4		0.4
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	50.1		25.1
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	139.4		119.4
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	61.4		-8.6
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	61.5		1.5
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	49.0		39.0
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	-31.3		-51.3
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	62.4		42.4
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	77.9		67.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	49.584	31.990
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.017	1.946
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	43.062	27.782
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	41.817	26.979
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	10.308	6.650
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	51.103	32.970
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.611	1.039
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	56.746	36.610
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	23.981	15.472
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	50.809	32.780
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.936	0.604
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	17.540	11.316
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	44.593	28.769
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.587	0.379
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	35.304	22.777
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	3.302	2.130
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.468	0.947
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.518	0.334
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	36.194	23.351
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	39.736	25.636
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	70.537	45.508
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	14.871	9.594
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	3.321	2.143
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	14.813	9.557
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	29.653	19.131
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	36.569	23.593
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	23.666	15.268
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	43.867	28.301
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	2.310	1.490
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	32.915	21.236
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	3.839	2.477
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	19.232	12.408
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.847	0.546
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	13.257	8.553
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	5.792	3.737
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.222	5.950
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	13.164	8.493
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	26.260	16.942
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	5.842	3.769
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.096	1.352
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	5.981	3.859
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	2.525	1.629
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	1.538	0.992
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	14.638	9.444
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	14.534	9.377
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	9.462	6.104
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.243	0.157
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	11.421	7.369
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	7.216	4.656
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	3.666	2.365
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	2.648	1.708
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	20.538	13.250
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	15.678	10.115
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	17.583	11.344
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	2.270	1.464
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	3.897	2.514
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	6.170	3.981
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	6.510	4.200
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.889	1.218
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	10.647	6.869
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	2.628	1.696
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.943	1.253
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.933	1.892
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	15.829	10.212
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.204	0.132
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	17.693	11.415
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	5.565	3.590
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	36.118	23.302
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	5.502	3.550
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	17.133	11.053
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	4.965	3.203
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	11.816	7.623
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.166	0.107
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	3.023	1.950
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	6.868	4.431
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	3.132	2.020
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	2.527	1.630
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	1.425	0.920
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.598	1.031
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	2.076	1.339
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.673	2.370

TABLE SLS-77
STUDY DAY: YEAR 2020
UNIMPROVED NETWORK
INPUT @ 147 FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	58.727	37.889		147.0	KNOWN	132.0
2	81	6	7	0	20.0	75.986	49.023		140.0	KNOWN	120.0
3	81	8	0	0	20.0	9.226	5.952		140.0	KNOWN	120.0
4	9	0	0	0	20.0	51.939	33.509		140.0	KNOWN	120.0
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	137.6		97.6
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	134.4		124.4
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	63.5		18.5
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	125.6		115.6
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	126.3		116.3
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	130.2		120.2
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	124.0		114.0
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	136.2		116.2
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	134.1		114.1
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	134.8		99.8
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	96.1		61.1
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	124.0		109.0
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	115.7		100.7
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	121.8		101.8
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	108.8		93.8
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	85.5		55.5
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	29.7		-10.3
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	122.4		112.4
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	56.6		46.6
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	90.1		75.1
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	97.6		87.6
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	70.1		55.1
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	70.2		60.2
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	72.5		62.5
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	83.8		68.8
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	88.1		78.1
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	109.8		99.8
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	122.9		112.9
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	87.7		67.7
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	92.2		72.2
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	89.0		79.0
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	93.3		83.3
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	96.0		81.0
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	99.5		84.5
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	99.5		84.5
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	101.7		81.7
41	45	51	50	0	35.0	-2.247	-1.450	KNOWN	117.8		82.8
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	109.9		94.9
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	65.9		55.9
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	57.4		42.4
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	56.3		41.3
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	56.3		36.3
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	43.2		-16.8
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	32.8		7.8
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	122.3		102.3
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	44.1		-25.9
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	44.3		-15.7
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	31.8		21.8
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	-48.7		-68.7
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	45.1		25.1
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	60.7		50.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	58.727	37.889
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	0.000	0.000
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	36.170	23.335
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	39.816	25.688
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	9.226	5.952
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	51.938	33.509
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.730	1.116
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	56.381	36.375
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	24.648	15.902
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	52.393	33.802
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.925	0.597
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	18.195	11.739
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	45.981	29.665
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.653	0.421
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	36.638	23.637
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	3.498	2.257
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.413	0.911
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.303	0.195
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	34.367	22.172
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	39.437	25.443
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	68.411	44.136
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	14.805	9.552
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	3.346	2.159
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	14.772	9.531
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	29.659	19.135
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	34.644	22.351
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	23.646	15.256
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	43.907	28.327
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	2.312	1.491
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	32.301	20.839
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	3.860	2.490
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	19.216	12.397
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.871	0.562
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	13.238	8.541
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	5.811	3.749
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.223	5.950
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	13.172	8.498
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	24.320	15.690
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	3.773	2.435
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.062	1.330
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	5.980	3.858
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	2.519	1.625
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	1.539	0.993
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	14.651	9.452
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	14.554	9.390
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	9.475	6.113
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.250	0.161
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	11.425	7.371
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	7.227	4.662
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	3.675	2.371
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	2.650	1.710
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	20.570	13.271
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	15.701	10.130
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	17.608	11.360
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	2.274	1.467
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	3.888	2.509
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	6.185	3.990
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	6.522	4.208
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.890	1.219
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	10.660	6.877
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	2.632	1.698
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.944	1.254
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.935	1.894
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	15.843	10.222
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.296	0.191
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	17.708	11.424
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	5.570	3.594
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	36.153	23.324
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	5.506	3.553
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	17.158	11.070
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	4.990	3.220
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	11.841	7.640
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.141	0.091
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	3.023	1.951
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	6.869	4.432
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	3.132	2.020
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	2.526	1.630
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	1.425	0.920
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.599	1.032
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	2.074	1.338
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.673	2.370

TABLE SLS-78
STUDY DAY: YEAR 2020
UNIMPROVED NETWORK
INPUT @ 140 FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	58.727	37.888		140.0	KNOWN	125.0
2	81	6	7	0	20.0	75.984	49.022		133.0	KNOWN	113.0
3	81	8	0	0	20.0	9.226	5.952		133.0	KNOWN	113.0
4	9	0	0	0	20.0	51.937	33.508		133.0	KNOWN	113.0
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	130.6		90.6
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	127.4		117.4
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	56.5		11.5
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	118.6		108.6
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	119.3		109.3
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	123.2		113.2
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	117.0		107.0
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	129.2		109.2
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	127.1		107.1
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	127.8		92.8
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	89.1		54.1
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	117.0		102.0
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	108.7		93.7
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	114.8		94.8
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	101.8		86.8
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	78.5		48.5
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	22.7		-17.3
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	115.4		105.4
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	49.6		39.6
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	83.1		68.1
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	90.6		80.6
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	63.1		48.1
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	63.2		53.2
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	65.5		55.5
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	76.8		61.8
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	81.1		71.1
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	102.8		92.8
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	115.9		105.9
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	80.7		60.7
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	85.2		65.2
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	82.0		72.0
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	86.3		76.3
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	89.0		74.0
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	92.5		77.5
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	92.5		77.5
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	94.7		74.7
41	45	51	50	0	35.0	-2.247	-1.450	KNOWN	110.8		75.8
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	102.9		87.9
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	58.9		48.9
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	50.4		35.4
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	49.3		34.3
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	49.3		29.3
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	36.2		-23.8
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	25.8		0.8
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	115.3		95.3
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	37.1		-32.9
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	37.3		-22.7
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	24.8		14.8
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	-55.7		-75.7
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	38.1		18.1
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	53.7		43.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	58.727	37.888
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	0.000	0.000
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	36.169	23.335
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	39.815	25.687
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	9.226	5.952
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	51.937	33.508
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.730	1.116
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	56.379	36.374
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	24.647	15.902
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	52.392	33.801
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.925	0.597
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	18.194	11.738
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	45.980	29.665
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.654	0.422
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	36.636	23.636
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	3.498	2.257
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.413	0.912
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.310	0.200
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	34.366	22.171
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	39.436	25.442
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	68.407	44.134
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	14.805	9.552
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	3.346	2.159
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	14.772	9.530
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	29.658	19.134
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	34.642	22.349
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	23.646	15.255
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	43.903	28.324
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	2.311	1.491
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	32.298	20.837
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	3.860	2.490
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	19.215	12.397
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.871	0.562
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	13.238	8.541
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	5.811	3.749
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.222	5.950
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	13.172	8.498
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	24.318	15.689
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	3.808	2.457
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.061	1.330
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	5.980	3.858
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	2.519	1.625
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	1.539	0.993
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	14.651	9.452
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	14.555	9.390
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	9.475	6.113
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.250	0.161
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	11.425	7.371
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	7.226	4.662
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	3.675	2.371
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	2.650	1.710
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	20.570	13.271
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	15.702	10.130
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	17.609	11.360
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	2.275	1.468
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	3.888	2.509
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	6.185	3.998
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	6.523	4.208
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.890	1.219
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	10.660	6.878
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	2.632	1.698
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.944	1.254
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.936	1.894
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	15.844	10.222
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.387	0.250
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	17.704	11.422
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	5.570	3.593
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	36.149	23.322
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	5.506	3.552
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	17.159	11.070
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	4.991	3.220
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	11.842	7.640
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.354	0.228
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	3.023	1.950
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	6.869	4.432
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	3.132	2.020
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	2.526	1.630
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	1.425	0.920
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.599	1.032
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	2.074	1.338
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.673	2.370

TABLE SLS-79
STUDY DAY: YEAR 2020
UNIMPORVED NETWORK
INPUT @ 135 FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	58.727	37.888		135.0	KNOWN	120.0
2	81	6	7	0	20.0	75.984	49.022		128.0	KNOWN	108.0
3	81	8	0	0	20.0	9.226	5.952		128.0	KNOWN	108.0
4	9	0	0	0	20.0	51.936	33.507		128.0	KNOWN	108.0
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	125.6		85.6
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	122.4		112.4
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	51.5		6.5
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	113.6		103.6
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	114.3		104.3
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	118.2		108.2
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	112.0		102.0
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	124.2		104.2
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	122.1		102.1
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	122.8		87.8
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	84.1		49.1
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	112.0		97.0
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	103.7		88.7
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	109.8		89.8
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	96.8		81.8
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	73.5		43.5
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	17.7		-22.3
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	110.4		100.4
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	44.6		34.6
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	78.1		63.1
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	85.6		75.6
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	58.1		43.1
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	58.2		48.2
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	60.5		50.5
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	71.8		56.8
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	76.1		66.1
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	97.8		87.8
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	110.9		100.9
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	75.7		55.7
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	80.2		60.2
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	77.0		67.0
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	81.3		71.3
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	84.0		69.0
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	87.5		72.5
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	87.5		72.5
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	89.7		69.7
41	45	51	50	0	35.0	-2.247	-1.450	KNOWN	105.8		70.8
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	97.9		82.9
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	53.9		43.9
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	45.4		30.4
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	44.3		29.3
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	44.3		24.3
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	31.2		-28.8
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	20.8		-4.2
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	110.3		90.3
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	32.1		-37.9
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	32.3		-27.7
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	19.8		9.8
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	-60.7		-80.7
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	33.1		13.1
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	48.7		38.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	58.727	37.888
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	0.000	0.000
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	36.170	23.335
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	39.814	25.687
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	9.226	5.952
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	51.936	33.507
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.730	1.116
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	56.379	36.373
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	24.648	15.902
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	52.393	33.802
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.925	0.597
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	18.195	11.739
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	45.981	29.665
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.653	0.422
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	36.637	23.637
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	3.498	2.257
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.413	0.912
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	0.310	0.200
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	34.365	22.171
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	39.435	25.442
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	68.406	44.133
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	14.805	9.552
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	3.346	2.159
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	14.772	9.531
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	29.658	19.134
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	34.640	22.348
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	23.646	15.255
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	43.902	28.324
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	2.311	1.491
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	32.297	20.837
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	3.860	2.490
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	19.216	12.397
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.871	0.562
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	13.238	8.541
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	5.811	3.749
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.222	5.950
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	13.172	8.498
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	24.316	15.688
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	3.886	2.507
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.061	1.330
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	5.980	3.858
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	2.519	1.625
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	1.539	0.993
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	14.651	9.452
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	14.554	9.390
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	9.475	6.113
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.250	0.161
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	11.425	7.371
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	7.227	4.662
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	3.675	2.371
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	2.650	1.710
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	20.570	13.271
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	15.701	10.130
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	17.608	11.360
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	2.275	1.467
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	3.888	2.509
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	6.185	3.990
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	6.523	4.208
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.890	1.219
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	10.660	6.878
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	2.632	1.698
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.944	1.254
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.935	1.894
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	15.844	10.222
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.252	0.163
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	17.704	11.422
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	5.570	3.593
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	36.149	23.322
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	5.506	3.552
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	17.158	11.070
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	4.991	3.220
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	11.842	7.640
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	0.224	0.145
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	3.023	1.951
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	6.869	4.432
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	3.132	2.020
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	2.526	1.630
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	1.425	0.920
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.599	1.032
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	2.074	1.338
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.674	2.370

TABLE SLS-80
STUDY DAY: YEAR 2020
UNIMPROVED NETWORK
INPUT 0 100 FEET

NODE	CONNECTING NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT FT	HEAD - HEAD	STATUS HEAD	PRESSURE HEAD ELEVATION +1
1	2	0	0	0	19.0	58.727	37.888		100.0		KNOWN	89.0
2	81	6	7	0	20.0	75.984	49.022		93.0		KNOWN	73.0
3	81	8	0	0	20.0	9.228	5.952		93.0		KNOWN	73.0
4	9	0	0	0	20.0	51.938	33.507		93.0		KNOWN	73.0
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	90.0			50.0
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	87.4			77.4
7	1	0	0	0	49.0	-2.914	-1.880	KNOWN	10.0			-28.5
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	70.0			60.0
9	16	5	15	46	10.0	-7.760	-5.010	KNOWN	79.3			69.3
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	83.2			73.2
11	15	14	13	26	10.0	-5.674	-3.790	KNOWN	77.0			67.0
12	7	80	13	11	20.0	-5.760	-3.720	KNOWN	89.2			69.2
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	87.1			67.1
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	87.8			52.8
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	49.1			14.1
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	77.0			62.0
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	68.7			53.7
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	74.8			54.8
19	74	28	24	25	15.0	-1.441	-0.930	KNOWN	61.8			46.8
20	73	80	21	0	30.0	-5.394	-3.480	KNOWN	38.5			8.5
21	21	23	22	0	40.0	-9.027	-5.340	KNOWN	-17.5			-57.5
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	75.4			65.4
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	9.0			-5.4
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	43.1			28.1
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	50.0			40.0
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	23.1			8.1
27	42	78	77	0	15.0	-0.775	-0.500	KNOWN	25.2			10.2
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	25.5			15.5
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	36.0			21.0
30	76	31	62	0	10.0	-1.938	-1.250	KNOWN	41.1			31.1
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	62.8			52.8
32	26	29	27	0	15.0	-4.139	-2.670	KNOWN	79.9			65.9
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	40.7			20.7
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	45.2			25.2
35	71	80	59	0	10.0	-2.247	-1.450	KNOWN	42.0			32.0
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	46.3			36.3
37	61	58	56	0	15.0	-3.242	-2.090	KNOWN	49.0			34.0
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	52.5			37.5
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	52.5			37.5
40	52	51	51	0	20.0	-3.886	-2.510	KNOWN	54.7			34.7
41	45	51	50	0	15.0	-2.247	-1.450	KNOWN	70.8			55.8
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	62.9			47.9
43	77	67	69	0	10.0	-1.193	-0.770	KNOWN	18.9			8.9
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	10.4			-4.6
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	9.3			-5.7
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	9.0			-10.7
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	-3.0			-93.8
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	-14.2			-39.2
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	75.3			55.3
50	36	78	0	0	70.0	-3.673	-2.370	KNOWN	-2.9			-72.9
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	-2.7			-62.7
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	-19.4			-29.2
53	22	0	0	0	20.0	-9.224	-5.950	KNOWN	-97.7			-115.7
54	34	35	79	0	20.0	-2.489	-1.600	KNOWN	-1.9			-21.9
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	13.7			3.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	0	48.0	2880.0	67.0	0.0067	KNOWN	58.727	37.888
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	0.000	0.000
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	36.170	23.335
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	39.815	25.687
8	3	5	36.0	1600.0	65.0	0.0386	KNOWN	9.226	5.952
9	4	5	48.0	2000.0	120.0	0.0010	KNOWN	51.924	33.506
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.730	1.116
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	56.381	36.375
1	6	7	16.0	11700.0	50.0	9.7654	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	24.648	15.902
4	6	10	48.0	1920.0	88.0	0.0028	KNOWN	22.393	33.802
10	7	8	16.0	592.0	40.0	0.7482	KNOWN	0.925	0.597
47	8	18	48.0	3200.0	67.0	0.0180	KNOWN	18.195	11.739
5	10	7	48.0	2240.0	86.0	0.0033	KNOWN	45.981	29.665
15	9	11	16.0	4900.0	40.0	5.0052	KNOWN	0.659	0.422
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	36.637	23.637
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	3.498	2.257
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.413	0.912
28	10	11	24.0	1650.0	30.0	0.4929	KNOWN	0.318	0.205
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	34.365	22.171
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	39.432	25.440
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	68.406	44.133
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	14.805	9.552
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	3.346	2.159
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	14.772	9.531
75	15	17	30.0	950.0	80.0	0.0156	KNOWN	29.658	19.134
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	34.648	22.348
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	23.646	15.255
45	18	41	48.0	4550.0	120.0	0.0030	KNOWN	43.960	28.324
49	19	42	16.0	5600.0	75.0	2.9135	KNOWN	2.311	1.491
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	32.297	20.837
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	3.860	2.490
24	19	23	30.0	3600.0	50.0	5.2193	KNOWN	19.216	12.397
29	31	19	16.0	2000.0	80.0	1.1938	KNOWN	8.871	5.862
21	20	21	24.0	6760.0	66.0	0.4688	KNOWN	13.238	8.541
23	21	23	20.0	5120.0	65.0	1.0309	KNOWN	5.811	3.749
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.222	5.950
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	13.172	8.498
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	24.316	15.688
44	22	45	48.0	3840.0	120.0	0.0030	KNOWN	3.888	2.508
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	2.061	1.330
34	23	54	20.0	1760.0	55.0	3.4163	KNOWN	5.980	3.858
43	23	24	16.0	2560.0	64.0	1.3561	KNOWN	2.519	1.625
65	24	24	16.0	3360.0	50.0	2.8102	KNOWN	1.539	0.993
64	24	33	36.0	2480.0	80.0	0.0162	KNOWN	14.691	9.452
52	4	24	30.0	4960.0	80.0	0.0814	KNOWN	14.594	9.398
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	9.475	6.113
42	2	26	16.0	3200.0	60.0	1.9101	KNOWN	0.280	0.181
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	11.425	7.371
12	28	46	20.0	1760.0	60.0	0.3944	KNOWN	7.227	4.662
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	3.675	2.371
77	27	43	16.0	1800.0	70.0	0.7181	KNOWN	2.650	1.710
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	28.570	13.271
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	15.701	10.130
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	17.608	11.360
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	2.275	1.467
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	3.888	2.509
27	32	31	20.0	1600.0	50.0	0.4314	KNOWN	6.185	3.990
62	34	31	24.0	1920.0	65.0	0.1372	KNOWN	6.523	4.208
60	34	35	16.0	2880.0	80.0	0.9816	KNOWN	1.890	1.219
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	18.660	8.878
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	2.632	1.698
58	37	36	16.0	2240.0	80.0	0.7818	KNOWN	1.944	1.254
57	39	36	16.0	2480.0	80.0	0.8414	KNOWN	2.935	1.894
56	38	37	30.0	1280.0	80.0	0.0219	KNOWN	15.844	10.222
55	39	38	30.0	960.0	80.0	0.0092	KNOWN	8.256	5.165
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	17.704	11.422
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	5.570	3.593
51	41	40	30.0	1920.0	80.0	0.0210	KNOWN	36.149	23.322
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	5.506	3.552
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	17.198	11.070
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	4.993	3.220
69	55	44	30.0	1600.0	70.0	0.0836	KNOWN	11.842	7.640
40	46	45	30.0	1280.0	80.0	0.0610	KNOWN	6.141	3.891
39	45	47	16.0	2400.0	95.0	1.6828	KNOWN	3.023	1.951
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	6.869	4.432
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	3.132	2.020
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	2.526	1.630
35	52	46	16.0	9100.0	55.0	6.3855	KNOWN	1.425	0.920
36	51	53	20.0	880.0	110.0	0.0577	KNOWN	1.599	1.032
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	2.074	1.338
70	55	52	16.0	3720.0	55.0	2.5943	KNOWN	3.673	2.370

Boston Water

APPENDIX SLS7

CHARLESTOWN CONNECTOR: YEAR 2020

Charles A. Maguire & Associates

Boston Hartford Providence

TABLE SLS-81
STUDY DAY: YEAR 2020
UNIMPROVED NETWORK
CHARLESTOWN CONNECTOR

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	37.269	24.045		160.0	KNOWN	145.0
2	81	6	7	0	20.0	59.336	38.283		158.5	KNOWN	138.5
3	81	8	0	0	20.0	11.318	7.302		158.5	KNOWN	138.5
4	9	0	0	0	20.0	38.156	24.617		157.9	KNOWN	137.9
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	156.6		116.6
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	154.6		144.6
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	83.7		38.7
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	150.9		140.9
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	151.1		141.1
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	152.7		142.7
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	148.6		138.6
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	155.9		135.9
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	154.6		134.6
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	154.9		119.9
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	119.3		84.3
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	149.5		134.5
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	141.3		126.3
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	149.9		129.9
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	134.6		119.6
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	109.3		79.3
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	55.4		15.4
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	149.3		139.3
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	84.4		74.4
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	120.3		105.3
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	125.7		115.7
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	98.5		83.5
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	99.0		89.0
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	101.6		91.6
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	113.7		98.7
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	116.1		106.1
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	136.0		126.0
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	149.3		139.3
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	117.9		97.9
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	122.8		102.8
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	119.5		109.5
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	124.2		114.2
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	126.9		111.9
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	130.6		115.6
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	130.6		115.6
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	132.9		112.9
41	45	51	50	0	35.0	47.544	30.674		150.0	KNOWN	115.0
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	141.1		126.1
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	94.6		84.6
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	85.5		70.5
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	84.2		69.2
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	84.2		64.2
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	71.1		11.1
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	60.7		35.7
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	149.9		129.9
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	72.0		2.0
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	72.1		12.1
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	60.2		50.2
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	-23.1		-43.1
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	73.0		53.0
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	89.1		79.1

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	37.269	24.045
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.017	1.946
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	29.892	19.285
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	32.463	20.944
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	8.301	5.356
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	38.156	24.617
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.136	0.733
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	42.268	27.269
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	15.406	9.939
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	33.900	21.871
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.502	0.324
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.530	5.503
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	28.204	18.196
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.681	0.439
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	19.255	12.423
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	2.782	1.795
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.067	0.688
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	1.344	0.867
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	26.766	17.268
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	25.967	16.753
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	47.339	30.541
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	14.161	9.136
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	3.562	2.298
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	14.344	9.254
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	29.446	18.997
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	12.752	8.227
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	23.218	14.980
45	41	18	48.0	4550.0	120.0	0.0036	KNOWN	4.374	2.822
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.975	1.274
48	18	49	48.0	640.0	85.0	0.0010	KNOWN	6.651	4.291
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	4.041	2.607
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	18.816	12.139
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	1.080	0.697
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	12.991	8.381
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	6.058	3.909
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.222	5.950
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	12.818	8.270
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	2.396	1.546
44	49	22	48.0	3840.0	120.0	0.0030	KNOWN	17.676	11.404
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	1.436	0.927
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	5.958	3.844
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	2.112	1.363
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	1.580	1.019
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	14.866	9.591
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	15.217	9.817
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	9.528	6.147
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.505	0.326
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	11.301	7.291
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	7.357	4.747
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	3.952	2.550
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	2.672	1.724
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	21.341	13.768
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	16.195	10.449
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	18.198	11.740
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	2.415	1.558
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	3.711	2.394
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	6.217	4.011
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	6.897	4.450
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.929	1.245
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	11.074	7.144
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	2.734	1.764
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.977	1.276
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	3.004	1.938
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	16.290	10.510
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.499	0.322
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	18.195	11.739
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	5.595	3.609
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	37.302	24.066
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	5.868	3.786
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	17.674	11.403
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	5.507	3.553
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	12.358	7.973
40	45	46	30.0	1280.0	80.0	0.0210	KNOWN	0.369	0.238
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	3.030	1.955
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	6.884	4.441
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	3.133	2.021
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	2.521	1.627
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	1.424	0.919
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.619	1.045
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	2.054	1.325
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.673	2.370

TABLE SLS-82
STUDY DAY: YEAR 2020
REHABILITATION: FIRST STAGE
CHARLESTOWN CONNECTOR

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	37.497	24.192		160.0	KNOWN	145.0
2	81	6	7	0	20.0	59.857	38.617		158.5	KNOWN	138.5
3	81	8	0	0	20.0	11.363	7.331		158.5	KNOWN	138.5
4	9	0	0	0	20.0	38.454	24.809		157.9	KNOWN	137.9
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	156.5		116.5
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	154.5		144.5
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	83.6		38.6
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	150.8		140.8
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	151.0		141.0
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	152.6		142.6
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	148.4		138.4
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	155.9		135.9
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	154.5		134.5
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	154.8		119.8
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	122.0		87.0
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	149.2		134.2
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	142.7		127.7
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	149.8		129.8
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	137.7		122.7
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	112.9		82.9
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	64.9		24.9
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	148.8		138.8
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	101.2		91.2
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	128.1		113.1
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	133.5		123.5
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	111.4		96.4
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	111.5		101.5
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	113.3		103.3
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	122.5		107.5
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	126.6		116.6
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	138.1		128.1
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	148.9		138.9
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	125.8		105.8
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	128.7		108.7
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	125.9		115.9
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	129.3		119.3
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	131.7		116.7
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	134.6		119.6
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	134.6		119.6
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	138.5		118.5
41	45	51	50	0	35.0	46.457	29.972		150.0	KNOWN	115.0
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	142.6		127.6
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	107.9		97.9
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	101.5		86.5
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	101.3		86.3
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	101.4		81.4
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	88.2		28.2
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	77.8		52.8
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	149.7		129.7
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	89.1		19.1
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	89.2		29.2
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	74.9		64.9
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	-13.6		-33.6
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	90.0		70.0
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	103.8		93.8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	37.497	24.192
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.017	1.946
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	30.145	19.449
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	32.728	21.115
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	8.346	5.384
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	38.454	24.809
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.155	0.745
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	42.591	27.478
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	15.515	10.010
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	34.271	22.110
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.470	0.303
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.608	5.553
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	28.530	18.406
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.694	0.448
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	19.600	12.645
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	2.828	1.824
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.081	0.698
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	1.271	0.820
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	27.036	17.442
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	26.900	17.355
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	48.543	31.318
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	13.552	8.743
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	3.441	2.220
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	13.613	8.783
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	26.002	16.776
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	17.471	11.272
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	19.894	12.835
45	41	18	48.0	4550.0	120.0	0.0036	KNOWN	8.333	5.376
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.771	1.142
48	18	49	48.0	640.0	85.0	0.0010	KNOWN	10.891	7.027
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	3.986	2.572
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	15.811	10.201
25	31	19	16.0	2000.0	135.0	0.2663	KNOWN	1.344	0.867
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	12.206	7.875
23	23	21	20.0	5120.0	60.0	1.0309	KNOWN	6.844	4.415
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.222	5.950
30	22	25	20.0	1040.0	135.0	0.0467	KNOWN	22.800	14.710
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	7.793	5.028
44	49	22	48.0	3840.0	120.0	0.0030	KNOWN	22.260	14.362
33	46	23	30.0	4800.0	135.0	0.0299	KNOWN	2.313	1.492
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	5.917	3.817
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	4.460	2.877
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	1.444	0.931
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	14.387	9.282
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	12.253	7.905
76	25	30	20.0	800.0	135.0	0.0359	KNOWN	17.164	11.073
42	27	26	16.0	3200.0	135.0	0.4261	KNOWN	0.333	0.215
31	30	26	20.0	1600.0	135.0	0.0719	KNOWN	17.996	11.610
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	13.667	8.818
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	3.260	2.103
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	2.365	1.526
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	18.437	11.895
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	13.983	9.021
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	16.033	10.344
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	1.813	1.169
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	2.770	1.787
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	5.539	3.573
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	5.211	3.362
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.771	1.142
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	9.229	5.954
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	2.289	1.477
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.834	1.184
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.702	1.743
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	14.296	9.223
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.158	0.102
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	16.664	10.751
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	4.839	3.122
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	32.811	21.168
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	5.315	3.429
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	15.154	9.777
41	44	45	30.0	2720.0	135.0	0.0170	KNOWN	2.987	1.927
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	9.838	6.347
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	2.159	1.393
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	3.038	1.960
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	6.917	4.463
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	3.135	2.023
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	2.515	1.623
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	1.422	0.917
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.659	1.070
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	2.015	1.300
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.673	2.370

TABLE SLS-83
STUDY DAY: YEAR 2020
REHABILITATION: SECOND STAGE
CHARLESTOWN CONNECTOR

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	37.630	24.277		160.0	KNOWN	145.0
2	81	6	7	0	20.0	60.524	39.048		158.5	KNOWN	138.5
3	81	8	0	0	20.0	11.472	7.401		158.5	KNOWN	138.5
4	9	0	0	0	20.0	39.182	25.279		157.9	KNOWN	137.9
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	156.5		116.5
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	154.5		144.5
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	83.6		38.6
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	150.7		140.7
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	150.9		140.9
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	152.5		142.5
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	148.1		138.1
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	155.8		135.8
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	154.4		134.4
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	154.7		119.7
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	122.1		87.1
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	148.8		133.8
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	139.5		124.5
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	149.8		129.8
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	131.5		116.5
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	113.4		83.4
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	72.2		32.2
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	148.6		138.6
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	118.5		108.5
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	132.2		117.2
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	136.7		126.7
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	122.1		107.1
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	121.8		111.8
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	122.0		112.0
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	128.1		113.1
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	131.8		121.8
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	134.5		124.5
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	148.6		138.6
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	130.4		110.4
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	132.3		112.3
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	129.9		119.9
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	132.4		122.4
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	134.5		119.5
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	136.9		121.9
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	136.9		121.9
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	138.6		118.6
41	45	51	50	0	35.0	44.819	28.915		150.0	KNOWN	115.0
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	143.5		128.5
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	120.9		110.9
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	117.7		102.7
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	117.7		102.7
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	117.8		97.8
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	104.8		44.8
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	94.5		69.5
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	149.6		129.6
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	105.8		35.8
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	105.9		45.9
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	89.2		79.2
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	-6.3		-26.3
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	106.8		86.8
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	118.0		108.0

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	37.630	24.277
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.017	1.946
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	30.293	19.544
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	33.248	21.450
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	8.455	5.455
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	39.182	25.279
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.183	0.763
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	43.400	28.000
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	15.569	10.045
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	34.497	22.256
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.449	0.290
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.640	5.574
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	28.676	18.501
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.723	0.467
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	19.739	12.735
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	2.907	1.875
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.097	0.708
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	1.147	0.740
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	27.568	17.786
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	27.750	17.903
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	49.924	32.209
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	13.512	8.717
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	3.139	2.025
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	13.272	8.563
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	31.435	20.281
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	13.544	8.738
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	25.630	16.535
45	41	18	48.0	4550.0	120.0	0.0036	KNOWN	9.872	6.369
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.640	1.058
48	18	49	48.0	640.0	85.0	0.0010	KNOWN	12.596	8.127
20	19	20	16.0	3200.0	68.0	1.9101	KNOWN	3.368	2.173
24	19	23	30.0	5600.0	135.0	0.0349	KNOWN	24.497	15.804
25	31	19	16.0	2000.0	135.0	0.2663	KNOWN	3.676	2.372
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	11.246	7.256
23	23	21	20.0	5120.0	68.0	1.0309	KNOWN	7.803	5.034
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.222	5.950
30	22	25	20.0	1040.0	135.0	0.0467	KNOWN	19.843	12.802
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	2.989	1.928
44	49	22	48.0	3840.0	120.0	0.0030	KNOWN	24.103	15.550
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	5.294	3.415
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	6.037	3.895
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	4.069	2.625
65	24	29	16.0	3360.0	50.0	2.8182	KNOWN	1.213	0.782
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	12.558	8.102
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	10.585	6.829
76	25	30	20.0	800.0	135.0	0.0359	KNOWN	14.595	9.416
42	26	27	16.0	3200.0	135.0	0.4261	KNOWN	0.866	0.559
31	30	26	20.0	1600.0	135.0	0.0719	KNOWN	13.967	9.011
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	8.654	5.583
78	28	27	16.0	450.0	135.0	0.0599	KNOWN	2.052	1.324
77	27	43	16.0	1600.0	135.0	0.2131	KNOWN	2.141	1.381
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	14.741	9.511
67	28	43	30.0	1920.0	135.0	0.0120	KNOWN	11.482	7.408
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	13.093	8.447
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	1.286	0.830
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.309	0.845
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	6.411	4.136
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	4.100	2.645
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.599	1.032
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	7.947	5.127
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	1.934	1.248
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.709	1.103
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.473	1.595
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	12.895	8.319
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.367	0.237
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	15.510	10.006
54	42	39	16.0	960.0	70.0	0.4389	KNOWN	4.354	2.809
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	29.985	19.345
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	4.961	3.201
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	12.441	8.027
41	44	45	30.0	2720.0	135.0	0.0170	KNOWN	0.116	0.075
69	55	44	30.0	1600.0	135.0	0.0100	KNOWN	7.163	4.621
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	4.830	3.116
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	2.996	1.933
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	6.840	4.413
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	3.128	2.018
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	2.551	1.646
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	1.429	0.922
36	51	50	20.0	880.0	110.0	0.0577	KNOWN	1.546	0.997
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	2.128	1.373
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.673	2.370

TABLE SLS-84
STUDY DAY: YEAR 2020
REHABILITATION: THIRD STAGE
CHARLESTOWN CONNECTOR

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	37.618	24.270		160.0	KNOWN	145.0
2	81	6	7	0	20.0	60.190	38.832		158.5	KNOWN	138.5
3	81	8	0	0	20.0	11.379	7.341		158.5	KNOWN	138.5
4	9	0	0	0	20.0	38.564	24.880		157.9	KNOWN	137.9
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	156.5		116.5
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	154.5		144.5
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	83.6		38.6
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	150.7		140.7
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	150.9		140.9
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	152.5		142.5
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	148.1		138.1
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	155.9		135.9
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	154.5		134.5
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	154.8		119.8
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	127.7		92.7
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	148.8		133.8
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	139.5		124.5
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	149.8		129.8
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	131.1		116.1
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	121.1		91.1
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	109.6		69.6
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	148.6		138.6
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	119.3		109.3
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	130.9		115.9
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	136.8		126.8
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	123.5		108.5
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	123.6		113.6
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	124.0		114.0
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	126.3		111.3
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	132.1		122.1
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	134.4		124.4
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	148.6		138.6
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	128.9		108.9
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	130.9		110.9
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	127.7		117.7
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	131.0		121.0
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	133.4		118.4
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	136.0		121.0
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	136.0		121.0
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	137.8		117.8
41	45	51	50	0	35.0	45.874	29.596		150.0	KNOWN	115.0
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	143.1		128.1
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	122.8		112.8
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	119.1		104.1
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	119.0		104.0
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	119.1		99.1
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	115.4		55.4
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	113.6		88.6
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	149.7		129.7
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	115.9		45.9
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	115.9		55.9
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	90.7		80.7
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	31.2		11.2
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	116.3		96.3
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	119.5		109.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	37.619	24.270
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.017	1.946
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	30.280	19.536
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	32.926	21.243
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	8.362	5.395
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	38.564	24.880
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.176	0.759
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	42.695	27.545
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	15.565	10.042
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	34.478	22.244
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.451	0.291
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.638	5.573
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	28.663	18.492
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.721	0.465
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	19.725	12.726
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	2.900	1.871
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.099	0.709
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	1.154	0.744
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	27.237	17.572
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	28.321	18.272
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	50.166	32.365
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	12.236	7.894
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	2.549	1.645
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	11.406	7.359
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	31.498	20.321
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	13.716	8.849
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	26.280	16.955
45	41	18	48.0	4550.0	120.0	0.0036	KNOWN	9.754	6.293
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.688	1.089
48	18	49	48.0	640.0	85.0	0.0010	KNOWN	12.424	8.016
20	19	20	16.0	3200.0	135.0	0.4261	KNOWN	5.501	3.549
24	19	23	30.0	5600.0	135.0	0.0349	KNOWN	23.200	14.968
25	31	19	16.0	2000.0	135.0	0.2663	KNOWN	3.858	2.489
21	20	21	24.0	6720.0	135.0	0.1242	KNOWN	11.513	7.428
23	23	21	20.0	5120.0	135.0	0.2300	KNOWN	7.537	4.862
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.222	5.950
30	22	25	20.0	1040.0	135.0	0.0467	KNOWN	19.801	12.775
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	3.134	2.022
44	49	22	48.0	3840.0	120.0	0.0030	KNOWN	23.920	15.432
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	3.136	2.023
34	23	54	20.0	1760.0	135.0	0.0791	KNOWN	7.163	4.622
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	4.660	3.006
65	24	29	16.0	3360.0	50.0	2.8182	KNOWN	1.309	0.844
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	13.485	8.700
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	11.018	7.108
76	25	30	20.0	800.0	135.0	0.0359	KNOWN	13.964	9.009
42	27	26	16.0	3200.0	135.0	0.4261	KNOWN	0.318	0.205
31	30	26	20.0	1600.0	135.0	0.0719	KNOWN	13.185	8.507
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	8.829	5.696
78	28	27	16.0	450.0	135.0	0.0599	KNOWN	2.947	1.901
77	27	43	16.0	1600.0	135.0	0.2131	KNOWN	2.079	1.342
66	29	28	30.0	2000.0	135.0	0.0125	KNOWN	16.552	10.679
67	28	43	30.0	1920.0	135.0	0.0120	KNOWN	12.412	8.008
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	14.191	9.155
71	35	29	16.0	3200.0	135.0	0.4261	KNOWN	1.905	1.229
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	1.159	0.748
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	6.444	4.157
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	4.271	2.755
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.904	1.228
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	8.422	5.434
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	2.248	1.451
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.858	1.199
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.638	1.702
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	13.519	8.722
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	0.347	0.224
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	16.114	10.396
54	42	39	16.0	960.0	70.0	0.4389	KNOWN	4.539	2.928
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	31.022	20.014
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	5.098	3.289
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	13.298	8.579
41	44	45	30.0	2720.0	135.0	0.0170	KNOWN	1.130	0.729
69	55	44	30.0	1600.0	135.0	0.0100	KNOWN	7.981	5.149
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	2.487	1.604
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.509	0.974
38	46	51	20.0	1840.0	135.0	0.0826	KNOWN	7.199	4.645
72	47	48	20.0	5290.0	135.0	0.2376	KNOWN	3.015	1.945
37	51	47	20.0	800.0	135.0	0.0359	KNOWN	3.924	2.532
35	54	48	16.0	9100.0	135.0	1.2117	KNOWN	1.542	0.995
36	51	50	20.0	880.0	135.0	0.0395	KNOWN	0.264	0.171
79	54	50	20.0	1120.0	135.0	0.0503	KNOWN	3.141	2.027
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.673	2.370

TABLE SLS- 85
STUDY DAY: YEAR 2020
REHABILITATION: FOURTH STAGE
CHARLESTOWN CONNECTOR

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	37.451	24.162		160.0	KNOWN	145.0
2	81	6	7	0	20.0	60.787	39.217		158.5	KNOWN	138.5
3	81	8	0	0	20.0	11.653	7.518		158.5	KNOWN	138.5
4	9	0	0	0	20.0	40.378	26.051		157.9	KNOWN	137.9
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	156.4		116.4
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	154.5		144.5
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	83.6		38.6
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	150.8		140.8
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	151.0		141.0
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	152.6		142.6
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	148.4		138.4
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	155.7		135.7
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	154.3		134.3
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	154.5		119.5
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	140.2		105.2
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	149.2		134.2
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	142.9		127.9
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	149.8		129.8
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	137.7		122.7
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	136.5		106.5
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	121.1		81.1
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	148.9		138.9
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	126.6		116.6
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	134.5		119.5
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	140.5		130.5
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	130.1		115.1
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	130.2		120.2
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	130.7		120.7
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	132.9		117.9
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	137.7		127.7
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	143.4		133.4
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	148.9		138.9
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	133.6		113.6
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	133.9		113.9
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	132.9		122.9
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	133.6		123.6
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	134.6		119.6
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	136.6		121.6
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	136.6		121.6
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	138.0		118.0
41	45	51	50	0	35.0	43.357	27.972		150.0	KNOWN	115.0
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	143.4		128.4
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	129.5		119.5
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	126.1		111.1
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	126.1		111.1
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	126.2		106.2
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	122.6		62.6
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	120.8		95.8
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	149.8		129.8
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	123.1		53.1
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	123.1		63.1
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	97.7		87.7
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	42.6		22.6
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	123.5		103.5
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	126.5		116.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	37.451	24.162
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.017	1.946
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	30.094	19.416
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	33.709	21.748
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	8.636	5.572
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	40.378	26.051
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.173	0.757
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	44.788	28.895
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	15.489	9.993
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	34.201	22.065
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.475	0.306
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	8.586	5.539
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	28.454	18.357
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.697	0.450
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	19.516	12.591
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	2.833	1.828
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.069	0.690
28	16	11	24.0	1650.0	30.0	0.4929	KNOWN	1.275	0.823
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	28.047	18.095
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	24.633	15.892
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	47.284	30.506
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	18.016	11.623
19	17	15	16.0	3840.0	135.0	0.5113	KNOWN	2.478	1.599
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	17.115	11.042
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	25.499	16.451
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	16.715	10.784
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	20.354	13.132
45	41	18	48.0	4550.0	120.0	0.0036	KNOWN	7.591	4.897
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.666	1.075
48	18	49	48.0	640.0	85.0	0.0010	KNOWN	10.232	6.602
20	19	20	16.0	3200.0	135.0	0.4261	KNOWN	1.764	1.138
24	19	23	30.0	5600.0	135.0	0.0349	KNOWN	22.409	14.457
25	31	19	16.0	2000.0	135.0	0.2663	KNOWN	5.260	3.393
21	20	21	24.0	6720.0	135.0	0.1242	KNOWN	13.485	8.700
23	23	21	20.0	5120.0	135.0	0.2300	KNOWN	5.564	3.590
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.222	5.950
30	22	25	20.0	1040.0	135.0	0.0467	KNOWN	16.486	10.636
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	2.197	1.417
44	49	22	48.0	3840.0	120.0	0.0030	KNOWN	21.518	13.883
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	4.209	2.715
34	23	54	20.0	1760.0	135.0	0.0791	KNOWN	7.273	4.692
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	4.715	3.042
65	24	29	16.0	3360.0	135.0	0.4474	KNOWN	2.004	1.293
64	24	33	36.0	2400.0	135.0	0.0062	KNOWN	14.766	9.526
52	40	24	30.0	4960.0	135.0	0.0309	KNOWN	12.938	8.347
76	25	30	20.0	800.0	135.0	0.0359	KNOWN	10.592	6.834
42	27	26	16.0	3200.0	135.0	0.4261	KNOWN	0.385	0.248
31	30	26	20.0	1600.0	135.0	0.0719	KNOWN	12.327	7.953
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	8.263	5.331
78	28	27	16.0	450.0	135.0	0.0599	KNOWN	3.072	1.982
77	27	43	16.0	1600.0	135.0	0.2131	KNOWN	1.912	1.234
66	29	28	30.0	2000.0	135.0	0.0125	KNOWN	16.228	10.470
67	28	43	30.0	1920.0	135.0	0.0120	KNOWN	11.963	7.718
63	33	29	30.0	800.0	135.0	0.0050	KNOWN	14.659	9.457
71	35	29	16.0	3200.0	135.0	0.4261	KNOWN	0.306	0.197
82	31	30	16.0	3900.0	135.0	0.5193	KNOWN	3.672	2.369
27	32	31	20.0	1600.0	135.0	0.0719	KNOWN	10.359	6.683
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	3.453	2.228
60	34	35	16.0	2800.0	135.0	0.3728	KNOWN	1.726	1.114
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	7.432	4.795
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.939	0.606
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.169	0.754
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.018	1.302
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	11.840	7.639
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.148	0.096
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	13.939	8.993
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	4.414	2.848
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	30.768	19.850
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	4.996	3.223
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	12.682	8.182
41	44	45	30.0	2720.0	135.0	0.0170	KNOWN	0.514	0.332
69	55	44	30.0	1600.0	135.0	0.0100	KNOWN	7.365	4.752
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	3.082	1.989
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.489	0.960
38	46	51	20.0	1840.0	135.0	0.0826	KNOWN	7.111	4.587
72	47	48	20.0	5290.0	135.0	0.2376	KNOWN	3.010	1.942
37	51	47	20.0	800.0	135.0	0.0359	KNOWN	3.939	2.541
35	54	48	16.0	9100.0	135.0	1.2117	KNOWN	1.547	0.998
36	51	50	20.0	880.0	135.0	0.0395	KNOWN	0.428	0.276
79	54	50	20.0	1120.0	135.0	0.0503	KNOWN	3.245	2.094
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.673	2.370

TABLE SLS-86
STUDY DAY: YEAR 2020
REHABILITATION: FIFTH STAGE
CHARLESTOWN CONNECTOR

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	63.077	40.695		160.0	KNOWN	145.0
2	81	6	7	0	20.0	79.240	51.123		158.5	KNOWN	138.5
3	81	8	0	0	20.0	15.905	10.261		158.5	KNOWN	138.5
4	9	0	0	0	20.0	23.098	14.902		157.9	KNOWN	137.9
5	8	9	80	10	40.0	-3.053	-1.970	KNOWN	157.4		117.4
6	2	6	1	3	10.0	-14.942	-9.640	KNOWN	156.1		146.1
7	1	0	0	0	45.0	-2.914	-1.880	KNOWN	85.2		40.2
8	3	16	47	0	10.0	-7.378	-4.760	KNOWN	152.8		142.8
9	16	5	15	46	10.0	-7.765	-5.010	KNOWN	152.8		142.8
10	4	5	14	0	10.0	-2.914	-1.880	KNOWN	154.2		144.2
11	15	14	13	28	10.0	-5.874	-3.790	KNOWN	152.1		142.1
12	7	80	13	11	20.0	-5.766	-3.720	KNOWN	157.0		137.0
13	11	12	17	0	20.0	-5.394	-3.480	KNOWN	156.3		136.3
14	10	12	18	0	35.0	-2.139	-1.380	KNOWN	156.4		121.4
15	18	19	73	0	35.0	-3.379	-2.180	KNOWN	144.7		109.7
16	28	17	75	26	15.0	-3.797	-2.450	KNOWN	151.3		136.3
17	19	75	74	0	15.0	-2.666	-1.720	KNOWN	148.0		133.0
18	47	45	49	48	20.0	-4.278	-2.760	KNOWN	151.4		131.4
19	74	20	24	25	15.0	-1.441	-0.930	KNOWN	145.1		130.1
20	73	20	21	0	30.0	-5.394	-3.480	KNOWN	141.6		111.6
21	21	23	22	0	40.0	-9.827	-6.340	KNOWN	126.9		86.9
22	30	29	44	0	10.0	-7.254	-4.680	KNOWN	150.9		140.9
23	24	23	33	34	10.0	-5.363	-3.460	KNOWN	133.0		123.0
24	43	65	64	52	15.0	-0.883	-0.570	KNOWN	140.6		125.6
25	30	43	76	0	10.0	-1.178	-0.760	KNOWN	144.4		134.4
26	42	31	32	0	15.0	-4.448	-2.870	KNOWN	135.8		120.8
27	42	78	77	0	10.0	-0.775	-0.500	KNOWN	136.1		126.1
28	78	66	67	0	10.0	-1.193	-0.770	KNOWN	136.7		126.7
29	65	66	63	71	15.0	-0.853	-0.550	KNOWN	139.0		124.0
30	76	31	82	0	10.0	-1.938	-1.250	KNOWN	142.0		132.0
31	25	82	27	0	10.0	-1.426	-0.920	KNOWN	147.4		137.4
32	26	29	27	0	10.0	-4.139	-2.670	KNOWN	151.0		141.0
33	64	63	62	0	20.0	-3.565	-2.300	KNOWN	139.7		119.7
34	62	60	61	0	20.0	-2.247	-1.450	KNOWN	140.1		120.1
35	71	60	59	0	10.0	-2.247	-1.450	KNOWN	139.1		129.1
36	59	58	57	0	10.0	-2.247	-1.450	KNOWN	139.8		129.8
37	61	58	56	0	15.0	-3.240	-2.090	KNOWN	140.8		125.8
38	56	55	53	0	15.0	-2.247	-1.450	KNOWN	142.9		127.9
39	57	55	54	0	15.0	-2.247	-1.450	KNOWN	142.9		127.9
40	52	53	51	0	20.0	-3.890	-2.510	KNOWN	144.7		124.7
41	45	51	50	0	35.0	12.305	7.939		150.0	KNOWN	115.0
42	49	54	50	0	15.0	-2.247	-1.450	KNOWN	146.2		131.2
43	77	67	68	0	10.0	-1.193	-0.770	KNOWN	135.5		125.5
44	41	69	0	0	15.0	-6.851	-4.420	KNOWN	132.3		117.3
45	41	40	39	0	15.0	-2.108	-1.360	KNOWN	132.3		117.3
46	33	32	40	38	20.0	-2.278	-1.470	KNOWN	132.4		112.4
47	39	72	37	0	60.0	-2.418	-1.560	KNOWN	128.8		68.8
48	72	35	0	0	25.0	-4.557	-2.940	KNOWN	127.0		102.0
49	46	48	44	0	20.0	-8.231	-5.310	KNOWN	151.4		131.4
50	36	79	0	0	70.0	-3.673	-2.370	KNOWN	129.3		59.3
51	38	37	36	0	60.0	-2.743	-1.770	KNOWN	129.3		69.3
52	70	0	0	0	10.0	-3.673	-2.370	KNOWN	103.8		93.8
53	22	0	0	0	20.0	-9.222	-5.950	KNOWN	48.4		28.4
54	34	35	79	0	20.0	-2.480	-1.600	KNOWN	129.8		109.8
55	68	69	70	0	10.0	-1.643	-1.060	KNOWN	132.7		122.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	135.0	0.0018	KNOWN	63.077	40.695
81	3	2	48.0	800.0	86.0	0.0012	KNOWN	3.017	1.946
6	2	6	48.0	4960.0	135.0	0.0031	KNOWN	36.190	23.348
7	2	12	48.0	1920.0	135.0	0.0012	KNOWN	46.068	29.721
8	3	5	30.0	1600.0	135.0	0.0100	KNOWN	12.889	8.315
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	23.099	14.903
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	0.800	0.516
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	32.134	20.732
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.914	1.880
3	6	8	40.0	4160.0	135.0	0.0064	KNOWN	29.044	18.738
4	6	10	48.0	1920.0	135.0	0.0012	KNOWN	52.372	33.788
16	8	9	16.0	592.0	135.0	0.0788	KNOWN	0.274	0.177
47	8	18	40.0	3200.0	135.0	0.0049	KNOWN	21.355	13.777
5	10	9	48.0	2240.0	135.0	0.0014	KNOWN	41.873	27.015
15	9	11	16.0	4000.0	135.0	0.5326	KNOWN	1.172	0.756
46	9	49	48.0	3350.0	135.0	0.0021	KNOWN	33.233	21.440
14	10	11	24.0	2720.0	135.0	0.0503	KNOWN	7.585	4.894
13	12	11	16.0	5120.0	135.0	0.6818	KNOWN	2.916	1.881
28	11	16	24.0	1650.0	135.0	0.0305	KNOWN	5.801	3.743
11	12	13	48.0	1440.0	135.0	0.0009	KNOWN	38.186	24.636
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	13.899	8.967
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	46.692	30.124
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	16.096	10.384
19	17	15	16.0	3840.0	135.0	0.5113	KNOWN	2.748	1.773
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	15.464	9.977
75	16	17	30.0	950.0	135.0	0.0059	KNOWN	30.342	19.575
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	18.332	11.827
74	17	19	30.0	1200.0	135.0	0.0075	KNOWN	24.931	16.084
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	24.962	16.104
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	1.486	0.958
48	49	18	48.0	640.0	135.0	0.0004	KNOWN	9.347	6.030
20	19	20	16.0	3200.0	135.0	0.4261	KNOWN	3.118	2.011
24	19	23	30.0	5600.0	135.0	0.0349	KNOWN	23.587	15.218
25	31	19	16.0	2000.0	135.0	0.2663	KNOWN	3.216	2.075
21	20	21	24.0	6720.0	135.0	0.1242	KNOWN	13.188	8.508
23	23	21	20.0	5120.0	135.0	0.2300	KNOWN	5.861	3.782
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.222	5.950
30	22	25	20.0	1040.0	135.0	0.0467	KNOWN	14.411	9.297
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	6.025	3.887
44	49	22	48.0	3840.0	120.0	0.0030	KNOWN	15.640	10.090
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	4.998	3.224
34	23	54	20.0	1760.0	135.0	0.0791	KNOWN	7.365	4.752
43	25	24	16.0	2560.0	135.0	0.3409	KNOWN	3.673	2.370
65	24	29	16.0	3360.0	135.0	0.4474	KNOWN	2.015	1.300
64	24	33	36.0	2400.0	135.0	0.0062	KNOWN	14.727	9.502
52	40	24	30.0	4960.0	135.0	0.0309	KNOWN	13.952	9.001
76	25	30	20.0	800.0	135.0	0.0359	KNOWN	9.560	6.168
42	27	26	16.0	3200.0	135.0	0.4261	KNOWN	0.910	0.587
31	30	26	20.0	1600.0	135.0	0.0719	KNOWN	11.164	7.203
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	7.626	4.920
78	28	27	16.0	450.0	135.0	0.0599	KNOWN	3.419	2.206
77	27	43	16.0	1600.0	135.0	0.2131	KNOWN	1.734	1.118
66	29	28	30.0	2000.0	135.0	0.0125	KNOWN	16.509	10.651
67	28	43	30.0	1920.0	135.0	0.0120	KNOWN	11.897	7.675
63	33	29	30.0	800.0	135.0	0.0050	KNOWN	14.879	9.599
71	35	29	16.0	3200.0	135.0	0.4261	KNOWN	0.468	0.302
82	31	30	16.0	3900.0	135.0	0.5193	KNOWN	3.541	2.285
27	32	31	20.0	1600.0	135.0	0.0719	KNOWN	8.185	5.280
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	3.717	2.398
60	34	35	16.0	2800.0	135.0	0.3728	KNOWN	1.740	1.122
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	7.704	4.970
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	0.976	0.630
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.176	0.759
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.048	1.321
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	12.119	7.819
55	38	39	30.0	560.0	80.0	0.0092	KNOWN	1.330	0.858
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	15.697	10.127
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	2.965	1.913
51	41	40	30.0	1280.0	135.0	0.0080	KNOWN	33.539	21.638
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	3.727	2.405
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	12.437	8.024
41	44	45	30.0	2720.0	135.0	0.0170	KNOWN	0.269	0.174
69	55	44	30.0	1600.0	135.0	0.0100	KNOWN	7.120	4.594
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	3.311	2.136
39	45	47	16.0	2400.0	55.0	1.6828	KNOWN	1.473	0.950
38	46	51	20.0	1840.0	135.0	0.0826	KNOWN	7.034	4.538
72	47	48	20.0	5290.0	135.0	0.2376	KNOWN	3.003	1.938
37	51	47	20.0	800.0	135.0	0.0359	KNOWN	3.949	2.547
35	54	48	16.0	9100.0	135.0	1.2117	KNOWN	1.554	1.002
36	51	50	20.0	880.0	135.0	0.0395	KNOWN	0.342	0.221
79	54	50	20.0	1120.0	135.0	0.0503	KNOWN	3.332	2.149
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.673	2.370

Boston Water

APPENDIX SLS8

FIRE STUDY

Charles A. Maguire & Associates

Boston Hartford Providence

TABLE SLS-87
STUDY DAY: YEAR 2020
FIRE NEAR NODE 29
TOTAL HEAD=60 FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	39.078	25.212		142.0	KNOWN	127.0
2	81	6	7	0	20.0	63.517	40.979		140.4	KNOWN	120.4
3	81	8	0	0	20.0	8.289	5.348		140.4	KNOWN	120.4
4	9	0	0	0	20.0	36.625	23.629		139.7	KNOWN	119.7
5	8	9	80	0	40.0	-1.720	-1.110	KNOWN	138.5		98.5
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	136.1		126.1
7	1	0	0	0	45.0	0.697	0.450	KNOWN	141.1		96.1
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	130.0		120.0
9	16	5	15	6	10.0	-4.541	-2.930	KNOWN	130.5		120.5
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	133.2		123.2
11	15	14	13	8	10.0	-3.426	-2.210	KNOWN	129.5		119.5
12	7	80	13	1	20.0	-3.224	-2.080	KNOWN	137.9		117.9
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	136.4		116.4
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	136.8		101.8
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	118.5		83.5
16	28	17	75	6	15.0	-2.216	-1.430	KNOWN	129.2		114.2
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	124.6		109.6
18	47	45	49	8	20.0	-2.495	-1.610	KNOWN	126.6		106.6
19	74	20	24	5	15.0	-0.837	-0.540	KNOWN	120.2		105.2
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	113.7		83.7
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	88.7		48.7
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	127.6		117.6
23	24	23	33	4	10.0	-2.077	-1.340	KNOWN	84.5		74.5
24	43	65	64	2	15.0	-0.511	-0.330	KNOWN	78.3		63.3
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	103.9		93.9
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	83.8		68.8
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	65.2		55.2
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	63.7		53.7
29	65	66	63	1	15.0	-49.332	-31.827		61.0	KNOWN	46.0
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	98.1		88.1
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	120.2		110.2
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	128.2		118.2
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	73.0		53.0
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	86.2		66.2
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	81.9		71.9
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	91.1		81.1
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	93.8		78.8
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	98.7		83.7
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	98.8		83.8
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	101.0		81.0
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	121.9		86.9
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	113.6		98.6
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	65.2		55.2
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	68.6		53.6
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	74.9		59.9
46	33	32	40	8	20.0	-1.007	-0.650	KNOWN	77.5		57.5
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	75.3		15.3
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	73.6		48.6
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	127.4		107.4
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	76.5		6.5
51	38	37	36	0	60.0	0.000	0.000	KNOWN	76.5		16.5
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	60.1		50.1
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	78.2		58.2
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	78.0		58.0
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	66.3		56.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	39.083	25.215
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	0.000	0.000
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	31.528	20.340
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	32.000	20.645
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	8.290	5.348
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	36.632	23.634
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.066	0.688
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	42.121	27.175
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	20.249	13.064
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	42.295	27.287
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.820	0.529
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	16.762	10.814
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	37.977	24.501
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.403	0.260
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	32.213	20.783
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	2.638	1.702
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.148	0.741
28	11	16	24.0	1650.0	30.0	0.4929	KNOWN	0.764	0.493
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	28.681	18.504
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	31.063	20.040
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	56.713	36.589
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	9.871	6.368
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.767	1.140
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	9.686	6.249
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	21.775	14.048
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	33.486	21.604
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	18.457	11.908
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	48.495	31.287
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	2.432	1.569
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	36.660	23.652
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.937	1.250
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	15.646	10.094
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	0.130	0.084
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	8.585	5.538
23	21	23	20.0	5120.0	60.0	1.0309	KNOWN	2.137	1.378
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.115	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	12.848	8.289
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	26.347	16.998
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	9.268	5.979
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	11.296	7.288
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	4.410	2.845
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	4.888	3.153
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	2.667	1.721
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	22.650	14.613
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	20.941	13.510
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	7.278	4.696
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	3.411	2.201
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	10.083	6.505
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	4.735	3.055
78	27	28	16.0	450.0	70.0	0.2020	KNOWN	2.989	1.929
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	0.240	0.155
66	28	29	30.0	2000.0	70.0	0.0420	KNOWN	9.472	6.111
67	43	28	30.0	1920.0	70.0	0.0403	KNOWN	7.004	4.519
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	32.334	20.861
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	4.848	3.128
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	3.937	2.540
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	4.721	3.046
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	11.761	7.588
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	2.233	1.441
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	15.311	9.878
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	3.934	2.538
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.947	1.256
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	3.304	2.132
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	19.149	12.354
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	2.137	1.378
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	18.330	11.825
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	6.759	4.360
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	41.533	26.796
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	5.644	3.641
68	55	43	30.0	1280.0	70.0	0.0269	KNOWN	7.435	4.797
41	45	44	30.0	2720.0	70.0	0.0572	KNOWN	12.752	8.227
69	44	55	30.0	1600.0	70.0	0.0336	KNOWN	9.745	6.287
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	13.249	8.548
39	47	45	16.0	2400.0	55.0	1.6828	KNOWN	0.433	0.280
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.774	1.145
72	4	48	20.0	5290.0	55.0	1.2512	KNOWN	1.183	0.763
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	2.685	1.732
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.817	0.527
36	50	51	20.0	880.0	110.0	0.0577	KNOWN	0.911	0.588
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	2.508	1.618
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.597	1.030

TABLE SLS-88
STUDY DAY: YEAR 2020
FIRE NEAR NODE 29
TOTAL HEAD=50 FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	111.517	71.946		153.0	KNOWN	138.0
2	81	6	7	0	20.0	114.747	74.030		146.0	KNOWN	126.0
3	81	8	0	0	20.0	15.401	9.936		146.0	KNOWN	126.0
4	9	0	0	0	20.0	41.773	26.951		146.0	KNOWN	126.0
5	8	9	80	0	40.0	-3.048	-1.966	KNOWN	144.4		104.4
6	2	6	1	3	10.0	-14.915	-9.623	KNOWN	141.7		131.7
7	1	0	0	0	45.0	-2.909	-1.877	KNOWN	71.1		26.1
8	3	16	47	0	10.0	-7.365	-4.751	KNOWN	132.2		122.2
9	16	5	15	6	10.0	-7.752	-5.001	KNOWN	132.2		122.2
10	4	5	14	0	10.0	-2.909	-1.877	KNOWN	136.6		126.6
11	15	14	13	8	10.0	-5.864	-3.783	KNOWN	131.6		121.6
12	7	80	13	1	20.0	-5.756	-3.713	KNOWN	143.2		123.2
13	11	12	17	0	20.0	-5.384	-3.474	KNOWN	141.6		121.6
14	10	12	18	0	35.0	-2.135	-1.378	KNOWN	141.9		106.9
15	18	19	73	0	35.0	-3.373	-2.176	KNOWN	118.4		83.4
16	28	17	75	6	15.0	-3.791	-2.446	KNOWN	128.6		113.6
17	19	75	74	0	15.0	-2.661	-1.717	KNOWN	121.6		106.6
18	47	45	49	8	20.0	-4.270	-2.755	KNOWN	126.6		106.6
19	74	20	24	5	15.0	-1.439	-0.928	KNOWN	114.4		99.4
20	73	20	21	0	30.0	-5.384	-3.474	KNOWN	112.1		82.1
21	21	23	22	0	40.0	-9.809	-6.329	KNOWN	80.7		40.7
22	30	29	44	0	10.0	-7.241	-4.672	KNOWN	126.7		116.7
23	24	23	33	4	10.0	-5.353	-3.454	KNOWN	80.5		70.5
24	43	65	64	2	15.0	-0.882	-0.569	KNOWN	65.5		50.5
25	30	43	76	0	10.0	-1.176	-0.759	KNOWN	102.0		92.0
26	42	31	32	0	15.0	-4.441	-2.865	KNOWN	74.6		59.6
27	42	78	77	0	10.0	-0.774	-0.499	KNOWN	54.4		44.4
28	78	66	67	0	10.0	-1.191	-0.769	KNOWN	52.7		42.7
29	65	66	63	1	15.0	-88.765	-57.268		50.0	KNOWN	35.0
30	76	31	82	0	10.0	-1.934	-1.248	KNOWN	96.0		86.0
31	25	62	27	0	10.0	-1.423	-0.918	KNOWN	118.4		108.4
32	26	29	27	0	10.0	-4.131	-2.665	KNOWN	127.2		117.2
33	64	63	62	0	20.0	-3.559	-2.296	KNOWN	59.1		39.1
34	62	60	61	0	20.0	-2.243	-1.447	KNOWN	67.2		47.2
35	71	60	59	0	10.0	-2.243	-1.447	KNOWN	61.8		51.8
36	59	58	57	0	10.0	-2.243	-1.447	KNOWN	71.4		61.4
37	61	58	56	0	15.0	-3.234	-2.086	KNOWN	73.6		58.6
38	56	55	53	0	15.0	-2.243	-1.447	KNOWN	85.1		70.1
39	57	55	54	0	15.0	-2.243	-1.447	KNOWN	85.1		70.1
40	52	53	51	0	20.0	-3.884	-2.506	KNOWN	91.4		71.4
41	45	51	50	0	35.0	-2.243	-1.447	KNOWN	114.1		79.1
42	49	54	50	0	15.0	-2.243	-1.447	KNOWN	103.4		88.4
43	77	67	68	0	10.0	-1.191	-0.769	KNOWN	54.1		44.1
44	41	69	0	0	15.0	-6.839	-4.412	KNOWN	59.6		44.6
45	41	40	39	0	15.0	-2.104	-1.358	KNOWN	66.4		51.4
46	33	32	40	8	20.0	-2.274	-1.467	KNOWN	69.9		49.9
47	39	72	37	0	60.0	-2.414	-1.557	KNOWN	67.9		7.9
48	72	35	0	0	25.0	-4.549	-2.935	KNOWN	66.7		41.7
49	46	48	44	0	20.0	-8.216	-5.301	KNOWN	127.1		107.1
50	36	79	0	0	70.0	-3.667	-2.366	KNOWN	69.4		-0.6
51	38	37	36	0	60.0	-2.739	-1.767	KNOWN	68.8		8.8
52	70	0	0	0	10.0	-3.667	-2.366	KNOWN	28.6		18.6
53	22	0	0	0	20.0	-9.206	-5.939	KNOWN	2.5		-17.5
54	34	35	79	0	20.0	-2.476	-1.597	KNOWN	71.8		51.8
55	68	69	70	0	10.0	-1.640	-1.058	KNOWN	57.4		47.4

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	135.0	0.0018	KNOWN	111.517	71.946
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	0.000	0.000
6	2	6	48.0	4960.0	135.0	0.0031	KNOWN	49.194	31.738
7	2	12	48.0	1920.0	135.0	0.0012	KNOWN	65.552	42.292
8	3	5	30.0	1600.0	135.0	0.0100	KNOWN	15.401	9.936
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	41.773	26.951
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.615	1.042
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	52.511	33.878
1	6	7	16.0	11700.0	50.0	9.7854	KNOWN	2.909	1.877
3	6	8	40.0	4160.0	135.0	0.0064	KNOWN	51.700	33.355
4	6	10	48.0	1920.0	135.0	0.0012	KNOWN	91.187	58.830
16	9	8	16.0	592.0	135.0	0.0788	KNOWN	0.307	0.198
47	8	18	40.0	3200.0	135.0	0.0049	KNOWN	44.642	28.802
5	10	9	48.0	2240.0	135.0	0.0014	KNOWN	76.327	49.243
15	9	11	16.0	4000.0	135.0	0.5326	KNOWN	1.098	0.708
46	9	49	48.0	3350.0	135.0	0.0021	KNOWN	67.171	43.336
14	10	11	24.0	2720.0	135.0	0.0503	KNOWN	11.951	7.711
13	12	11	16.0	5120.0	135.0	0.6818	KNOWN	4.620	2.980
28	11	16	24.0	1650.0	135.0	0.0305	KNOWN	11.804	7.616
11	12	13	48.0	1440.0	135.0	0.0009	KNOWN	56.792	36.640
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	26.895	17.351
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	78.302	50.517
18	14	15	24.0	3680.0	135.0	0.0680	KNOWN	23.481	15.149
19	17	15	16.0	3840.0	135.0	0.5113	KNOWN	2.663	1.718
73	15	20	24.0	1040.0	135.0	0.0192	KNOWN	22.772	14.692
75	16	17	30.0	950.0	135.0	0.0059	KNOWN	45.949	29.644
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	40.367	26.043
74	17	19	30.0	1200.0	135.0	0.0075	KNOWN	40.624	26.209
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	82.049	52.935
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	3.325	2.145
48	49	18	48.0	640.0	135.0	0.0004	KNOWN	45.002	29.034
20	19	20	16.0	3200.0	135.0	0.4261	KNOWN	2.473	1.595
24	19	23	30.0	5600.0	135.0	0.0349	KNOWN	41.035	26.474
25	31	19	16.0	2000.0	135.0	0.2663	KNOWN	4.322	2.789
21	20	21	24.0	6720.0	135.0	0.1242	KNOWN	19.860	12.813
23	21	23	20.0	5120.0	135.0	0.2300	KNOWN	0.845	0.545
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	9.206	5.939
30	22	25	20.0	1040.0	135.0	0.0467	KNOWN	29.555	19.068
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	22.843	14.738
44	49	22	48.0	3840.0	120.0	0.0030	KNOWN	13.953	9.002
33	23	46	30.0	4800.0	135.0	0.0299	KNOWN	23.833	15.376
34	23	54	20.0	1760.0	135.0	0.0791	KNOWN	12.693	8.189
43	25	24	16.0	2560.0	135.0	0.3489	KNOWN	12.466	8.042
65	24	29	16.0	3360.0	135.0	0.4474	KNOWN	6.794	4.383
64	24	33	36.0	2400.0	135.0	0.0062	KNOWN	42.630	27.503
52	40	24	30.0	4960.0	135.0	0.0309	KNOWN	37.840	24.413
76	25	30	20.0	800.0	135.0	0.0359	KNOWN	15.914	10.267
42	26	27	16.0	3200.0	135.0	0.4261	KNOWN	8.044	5.190
31	30	26	20.0	1600.0	135.0	0.0719	KNOWN	21.627	13.953
32	26	46	20.0	1760.0	135.0	0.0791	KNOWN	9.142	5.898
78	27	28	16.0	450.0	135.0	0.0599	KNOWN	6.116	3.946
77	27	43	16.0	1600.0	135.0	0.2131	KNOWN	1.154	0.745
66	28	29	30.0	2000.0	135.0	0.0125	KNOWN	18.188	11.734
67	43	28	30.0	1920.0	135.0	0.0120	KNOWN	13.263	8.557
63	33	29	30.0	800.0	135.0	0.0050	KNOWN	57.777	37.275
71	35	29	16.0	3200.0	135.0	0.4261	KNOWN	6.007	3.875
82	31	30	16.0	3900.0	135.0	0.5193	KNOWN	7.647	4.934
27	32	31	20.0	1600.0	135.0	0.0719	KNOWN	13.393	8.641
62	34	33	24.0	1920.0	135.0	0.0355	KNOWN	18.706	12.068
60	34	35	16.0	2800.0	135.0	0.3728	KNOWN	4.230	2.729
61	37	34	24.0	880.0	135.0	0.0163	KNOWN	25.179	16.245
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	4.020	2.594
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.746	1.126
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	4.518	2.915
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	30.159	19.457
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	0.528	0.340
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	31.599	20.386
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	7.565	4.881
51	41	40	30.0	1280.0	135.0	0.0080	KNOWN	73.323	47.305
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	6.484	4.183
68	55	43	30.0	1280.0	70.0	0.0269	KNOWN	13.300	8.581
41	45	44	30.0	2720.0	135.0	0.0170	KNOWN	25.446	16.417
69	44	55	30.0	1600.0	135.0	0.0100	KNOWN	18.607	12.005
40	46	45	30.0	1280.0	135.0	0.0080	KNOWN	26.625	17.178
39	47	45	16.0	2400.0	55.0	1.6828	KNOWN	0.925	0.597
38	46	51	20.0	1840.0	135.0	0.0826	KNOWN	4.076	2.630
72	47	48	20.0	5290.0	135.0	0.2376	KNOWN	2.378	1.534
37	51	47	20.0	800.0	135.0	0.0359	KNOWN	5.717	3.688
35	54	48	16.0	9100.0	135.0	1.2117	KNOWN	2.171	1.400
36	50	51	20.0	880.0	135.0	0.0395	KNOWN	4.380	2.826
79	54	50	20.0	1120.0	135.0	0.0503	KNOWN	8.047	5.192
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	3.667	2.366

TABLE SLS-89
STUDY DAY: YEAR 2020
FIRE NEAR NODE 29
TOTAL HEAD=40 FEET

NODE	CONNECTING PI E NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	41.361	26.685		142.0	KNOWN	127.0
2	81	6	7	0	20.0	68.059	43.909		140.4	KNOWN	120.4
3	81	8	0	0	20.0	8.723	5.628		140.4	KNOWN	120.4
4	9	0	0	0	20.0	39.595	25.545		139.7	KNOWN	119.7
5	8	9	80	0	40.0	-1.720	-1.110	KNOWN	138.3		98.3
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	135.4		125.4
7	1	0	0	0	45.0	0.697	0.450	KNOWN	140.5		95.5
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	128.4		118.4
9	16	5	15	6	10.0	-4.541	-2.930	KNOWN	129.0		119.0
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	132.2		122.2
11	15	14	13	8	10.0	-3.426	-2.210	KNOWN	128.1		118.1
12	7	80	13	1	20.0	-3.224	-2.080	KNOWN	137.6		117.6
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	135.8		115.8
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	136.4		101.4
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	115.9		80.9
16	28	17	75	6	15.0	-2.216	-1.430	KNOWN	127.6		112.6
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	122.2		107.2
18	47	45	49	0	20.0	-2.495	-1.610	KNOWN	124.4		104.4
19	74	20	24	5	15.0	-0.837	-0.540	KNOWN	117.1		102.1
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	110.4		80.4
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	81.6		41.6
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	125.6		115.6
23	24	23	33	4	10.0	-2.077	-1.340	KNOWN	74.5		64.5
24	43	65	64	2	15.0	-0.511	-0.330	KNOWN	63.0		48.0
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	96.8		86.8
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	72.7		57.7
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	47.2		37.2
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	44.7		34.7
29	65	66	63	1	15.0	-59.561	-38.426		40.0	KNOWN	25.0
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	90.0		80.0
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	117.1		107.1
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	126.4		116.4
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	56.2		36.2
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	73.8		53.8
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	68.4		58.4
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	80.4		70.4
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	83.6		68.6
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	89.8		74.8
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	89.9		74.9
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	92.6		72.6
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	118.6		83.6
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	108.5		93.5
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	47.3		37.3
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	52.8		37.8
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	61.9		46.9
46	33	32	40	8	20.0	-1.007	-0.650	KNOWN	65.3		45.3
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	63.0		3.0
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	61.5		36.5
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	125.3		105.3
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	64.6		-5.4
51	38	37	36	0	60.0	0.000	0.000	KNOWN	64.5		4.5
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	43.1		33.1
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	71.0		51.0
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	66.5		46.5
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	49.2		39.2

PIPE FROM TO D AMETER LENGTH HAZEN (C) RESISTENCE - STATUS -- DISCHARGE --

PIPE	FROM NODE	TO NODE	D AMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	41.361	26.685
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	0.000	0.000
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	34.027	21.953
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	34.031	21.956
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	8.723	5.628
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	39.595	25.545
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.174	0.757
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	45.423	29.305
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	21.845	14.094
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	45.499	29.354
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.892	0.576
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	18.428	11.889
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	41.021	26.465
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.398	0.256
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	35.189	22.703
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	2.789	1.799
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.232	0.795
28	11	16	24.0	1650.0	30.0	0.4929	KNOWN	0.992	0.640
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	30.750	19.839
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	33.736	21.765
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	61.448	39.644
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	10.493	6.770
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.812	1.169
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	10.352	6.679
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	23.466	15.139
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	36.758	23.715
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	20.104	12.970
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	54.313	35.041
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	2.706	1.746
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	41.087	26.507
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.964	1.267
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	17.213	11.125
25	19	31	16.0	2000.0	60.0	1.1938	KNOWN	0.090	0.058
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	9.278	5.986
23	21	23	20.0	5120.0	60.0	1.0309	KNOWN	2.830	1.826
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.115	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	14.273	9.208
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	29.222	18.853
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	10.718	6.915
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	13.050	8.419
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	4.916	3.172
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	5.678	3.663
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	3.113	2.008
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	26.193	16.898
52	48	24	30.0	4960.0	80.0	0.0814	KNOWN	24.139	15.573
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	7.912	5.105
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	4.055	2.616
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	11.167	7.205
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	5.175	3.339
78	27	28	16.0	450.0	70.0	0.2020	KNOWN	3.917	2.527
77	43	27	16.0	1600.0	70.0	0.7181	KNOWN	0.203	0.131
66	28	29	30.0	2000.0	70.0	0.0420	KNOWN	12.760	8.233
67	43	28	30.0	1920.0	70.0	0.0403	KNOWN	9.421	6.078
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	37.893	24.447
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	5.727	3.695
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	4.386	2.830
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	5.118	3.302
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	13.777	8.889
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	2.512	1.621
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	17.607	11.359
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	4.532	2.924
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	2.145	1.384
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	3.704	2.390
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	21.643	13.963
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	2.626	1.694
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	20.334	13.119
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	7.648	4.934
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	46.736	30.152
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	6.259	4.038
68	55	43	30.0	1280.0	70.0	0.0269	KNOWN	10.137	6.540
41	45	44	30.0	2720.0	70.0	0.0572	KNOWN	15.453	9.970
69	44	55	30.0	1600.0	70.0	0.0336	KNOWN	12.446	8.030
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	15.582	10.053
39	47	45	16.0	2400.0	55.0	1.6828	KNOWN	0.801	0.517
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.635	1.055
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.119	0.722
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	2.990	1.929
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.881	0.568
36	50	51	20.0	880.0	110.0	0.0577	KNOWN	1.354	0.874
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	2.951	1.904
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.596	1.030

TABLE SLS-90
STUDY DAY: YEAR 2020
FIRE NEAR NODE 29
TOTAL HEAD=15 FEET

NODE	CONNECTING PI E NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	43.809	28.264		142.0	KNOWN	127.0
2	81	6	7	0	20.0	72.865	47.010		140.4	KNOWN	120.4
3	81	8	0	0	20.0	9.188	5.928		140.4	KNOWN	120.4
4	9	0	0	0	20.0	42.708	27.554		139.7	KNOWN	119.7
5	8	9	80	0	40.0	-1.720	-1.110	KNOWN	138.1		98.1
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	134.7		124.7
7	1	0	0	0	45.0	0.697	0.450	KNOWN	139.7		94.7
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	126.6		116.6
9	16	5	15	6	10.0	-4.541	-2.930	KNOWN	127.3		117.3
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	131.0		121.0
11	15	14	13	8	10.0	-3.426	-2.210	KNOWN	126.4		116.4
12	7	80	13	1	20.0	-3.224	-2.080	KNOWN	137.3		117.3
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	135.3		115.3
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	135.9		100.9
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	113.0		78.0
16	28	17	75	6	15.0	-2.216	-1.430	KNOWN	125.7		110.7
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	119.6		104.6
18	47	45	49	0	20.0	-2.495	-1.610	KNOWN	121.9		101.9
19	74	20	24	5	15.0	-0.837	-0.540	KNOWN	113.6		98.6
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	106.9		76.9
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	73.8		33.8
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	123.3		113.3
23	24	23	33	4	10.0	-2.077	-1.340	KNOWN	63.1		53.1
24	43	65	64	2	15.0	-0.511	-0.330	KNOWN	45.0		30.0
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	88.7		78.7
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	60.2		45.2
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	26.1		16.1
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	22.3		12.3
29	65	66	63	1	15.0	-70.393	-45.415		15.0	KNOWN	0.0
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	80.8		70.8
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	113.6		103.6
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	124.3		114.3
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	36.2		16.2
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	59.3		39.3
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	52.6		42.6
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	67.9		57.9
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	71.7		56.7
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	79.4		64.4
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	79.5		64.5
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	82.8		62.8
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	114.8		79.8
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	102.7		87.7
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	26.3		16.3
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	34.6		19.6
45	41	40	39	0	15.0	-0.930	-0.600	KNOWN	47.0		32.0
46	33	32	40	8	20.0	-1.007	-0.650	KNOWN	51.5		31.5
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	49.1		-10.9
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	47.8		22.8
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	123.0		103.0
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	51.0		-19.0
51	38	37	36	0	60.0	0.000	0.000	KNOWN	50.8		-9.2
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	23.2		13.2
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	63.3		43.3
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	53.5		33.5
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	29.4		19.4

PIPE	FROM NODE	TO NODE	D AMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	43.809	28.264
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	0.000	0.000
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	36.670	23.658
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	36.194	23.351
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	9.188	5.928
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	42.708	27.553
80	5	12	16.0	1280.0	75.0	0.5056	KNOWN	1.285	0.829
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	48.890	31.542
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	23.542	15.189
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	48.892	31.544
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.971	0.626
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	20.204	13.035
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	44.259	28.554
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.386	0.249
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	38.361	24.749
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	2.944	1.899
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.319	0.851
28	11	16	24.0	1650.0	30.0	0.4929	KNOWN	1.223	0.789
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	32.936	21.249
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	36.557	23.585
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	66.455	42.874
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	11.140	7.187
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	1.850	1.194
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	11.037	7.121
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	25.232	16.278
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	40.230	25.955
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	21.832	14.085
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	60.526	39.049
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	3.000	1.935
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	45.817	29.559
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	1.979	1.277
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	18.858	12.167
25	19	31	16.0	2000.0	60.0	1.1938	KNOWN	0.157	0.101
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	9.978	6.438
23	21	23	20.0	5120.0	60.0	1.0309	KNOWN	3.530	2.278
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.116	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	15.778	10.179
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	32.285	20.829
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	12.276	7.920
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	14.868	9.592
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	5.444	3.512
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	6.526	4.210
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	3.590	2.316
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	29.981	19.343
52	48	24	30.0	4960.0	80.0	0.0814	KNOWN	27.557	17.778
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	8.570	5.529
42	26	27	16.0	3200.0	60.0	1.9101	KNOWN	4.735	3.055
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	12.301	7.936
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	5.628	3.631
78	27	28	16.0	450.0	70.0	0.2020	KNOWN	4.877	3.146
77	43	27	16.0	1600.0	70.0	0.7181	KNOWN	0.482	0.311
66	28	29	30.0	2000.0	70.0	0.0420	KNOWN	16.250	10.484
67	43	28	30.0	1920.0	70.0	0.0403	KNOWN	11.941	7.704
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	43.833	28.280
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	6.663	4.299
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	4.862	3.137
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	5.527	3.566
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	15.929	10.277
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	2.811	1.813
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	20.058	12.940
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	5.170	3.336
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	2.357	1.520
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	4.131	2.665
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	24.305	15.681
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	3.149	2.032
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	22.473	14.499
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	8.598	5.547
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	52.293	33.737
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	6.915	4.461
68	55	43	30.0	1280.0	70.0	0.0269	KNOWN	12.935	8.345
41	45	44	30.0	2720.0	70.0	0.0572	KNOWN	18.251	11.775
69	44	55	30.0	1600.0	70.0	0.0336	KNOWN	15.244	9.835
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	18.050	11.645
39	47	45	16.0	2400.0	55.0	1.6828	KNOWN	1.132	0.730
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.438	0.928
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	1.050	0.678
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	3.252	2.098
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	0.949	0.612
36	50	51	20.0	880.0	110.0	0.0577	KNOWN	1.813	1.170
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	3.410	2.200
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.596	1.030

TABLE SLS-91
STUDY DAY: YEAR 2020
FIRE NEAR NODE 45
TOTAL HEAD=15 FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT HGD	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	38.585	24.893		142.0	KNOWN	127.0
2	81	6	7	0	20.0	63.821	41.175		140.4	KNOWN	120.4
3	81	8	0	0	20.0	8.503	5.486		140.4	KNOWN	120.4
4	9	0	0	0	20.0	38.098	24.579		139.7	KNOWN	119.7
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	138.4		98.4
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	136.2		126.2
7	1	0	0	0	45.0	0.697	0.450	KNOWN	141.3		96.3
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	130.4		120.4
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	130.8		120.8
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	133.4		123.4
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	129.4		119.4
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	137.8		117.8
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	136.1		116.1
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	136.6		101.6
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	111.6		76.6
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	128.9		113.9
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	121.2		106.2
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	127.3		107.3
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	113.7		98.7
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	104.4		74.4
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	62.7		22.7
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	127.8		117.8
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	43.4		33.4
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	95.8		80.8
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	101.3		91.3
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	63.1		48.1
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	63.4		53.4
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	66.9		56.9
29	65	66	63	71	15.0	0.000	0.000	KNOWN	86.8		71.8
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	89.2		79.2
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	115.0		105.0
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	128.1		118.1
33	64	53	62	0	20.0	-2.077	-1.340	KNOWN	93.0		73.0
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	100.5		80.5
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	97.7		87.7
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	103.2		93.2
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	105.1		90.1
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	108.3		93.3
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	108.4		93.4
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	110.0		90.0
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	124.1		89.1
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	118.1		103.1
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	54.0		44.0
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	30.8		15.8
45	41	40	39	0	15.0	-51.760	-33.393		15.0	KNOWN	0.0
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	25.6		5.6
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	22.4		-37.6
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	21.4		-3.6
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	127.8		107.8
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	25.4		-44.6
51	38	37	36	0	60.0	0.000	0.000	KNOWN	25.0		-35.0
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	36.5		26.5
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	52.2		32.2
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	29.5		9.5
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	42.7		32.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	38.585	24.894
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	0.000	0.000
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	30.976	19.985
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	32.845	21.190
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	8.503	5.486
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	38.097	24.579
80	5	12	16.0	1260.0	75.0	0.5056	KNOWN	1.097	0.708
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	43.783	28.247
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	19.712	12.717
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	41.810	26.974
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.679	0.438
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	16.077	10.372
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	37.337	24.088
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.500	0.323
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	31.608	20.392
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	2.781	1.794
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.152	0.743
28	11	16	24.0	1650.0	30.0	0.4929	KNOWN	1.008	0.650
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	29.566	19.075
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	30.901	19.936
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	57.427	37.049
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	11.688	7.541
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	2.267	1.463
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	12.003	7.744
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	28.489	18.380
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	27.755	17.907
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	24.670	15.916
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	39.645	25.578
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	2.013	1.299
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	28.073	18.112
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	2.348	1.515
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	22.550	14.548
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	1.065	0.687
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	11.313	7.299
23	21	23	20.0	5120.0	60.0	1.0309	KNOWN	4.865	3.139
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.116	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	13.641	8.801
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	19.153	12.357
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	1.098	0.708
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	18.695	12.062
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	6.643	4.285
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	2.142	1.382
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	1.867	1.205
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	15.986	10.313
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	16.223	10.466
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	10.817	6.979
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.369	0.238
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	13.963	9.009
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	12.395	7.997
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	4.722	3.047
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	4.012	2.588
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	27.834	17.958
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	22.601	14.581
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	22.559	14.554
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	3.408	2.199
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	4.277	2.760
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	6.164	3.977
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	8.651	5.581
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.754	1.132
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	11.722	7.563
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	2.971	1.916
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.619	1.044
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.669	1.722
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	15.232	9.827
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	1.418	0.915
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	15.139	9.767
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	5.399	3.483
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	33.625	21.694
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	4.704	3.035
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	26.101	16.839
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	20.784	13.409
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	23.791	15.349
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	28.757	18.553
39	47	45	16.0	2400.0	55.0	1.6828	KNOWN	2.218	1.431
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.326	0.855
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	0.860	0.555
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	4.148	2.676
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	1.139	0.735
36	50	51	20.0	880.0	110.0	0.0577	KNOWN	2.822	1.820
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	4.418	2.850
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.596	1.030

TABLE SLS-92
STUDY DAY: YEAR 2020
FIRE NEAR NODE 45
TOTAL HEAD= 10 FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT HGD	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	38.907	25.102		142.0	KNOWN	127.0
2	81	6	7	0	20.0	64.512	41.621		140.4	KNOWN	120.4
3	81	8	0	0	20.0	8.577	5.534		140.4	KNOWN	120.4
4	9	0	0	0	20.0	38.591	24.897		139.7	KNOWN	119.7
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	138.3		98.3
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	136.1		126.1
7	1	0	0	0	45.0	0.697	0.450	KNOWN	141.2		96.2
8	3	16	47	0	10.0	-4.309	-2.780	KNOWN	130.2		120.2
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	130.6		120.6
10	4	5	14	0	10.0	-1.689	-1.090	KNOWN	133.3		123.3
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	129.1		119.1
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	137.7		117.7
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	136.1		116.1
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	136.5		101.5
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	111.0		76.0
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	128.6		113.6
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	120.7		105.7
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	127.0		107.0
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	112.9		97.9
20	73	20	21	0	30.0	-3.038	-1.960	KNOWN	103.6		73.6
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	60.6		20.6
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	127.5		117.5
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	39.9		29.9
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	94.5		79.5
25	30	43	76	0	10.0	-0.682	-0.440	KNOWN	100.2		90.2
26	42	31	32	0	15.0	-1.938	-1.250	KNOWN	60.4		45.4
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	60.7		50.7
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	64.5		54.5
29	65	66	63	71	15.0	0.000	0.000	KNOWN	85.2		70.2
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	87.6		77.6
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	114.3		104.3
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	127.9		117.9
33	64	63	62	0	20.0	-2.077	-1.340	KNOWN	91.6		71.6
34	62	60	61	0	20.0	-1.318	-0.850	KNOWN	99.4		79.4
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	96.5		86.5
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	102.2		92.2
37	61	58	56	0	15.0	-1.891	-1.220	KNOWN	104.2		89.2
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	107.5		92.5
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	107.5		92.5
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	109.2		89.2
41	45	51	50	0	35.0	-1.318	-0.850	KNOWN	123.7		88.7
42	49	54	50	0	15.0	-1.318	-0.850	KNOWN	117.6		102.6
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	50.9		40.9
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	26.6		11.6
45	41	40	39	0	15.0	-53.339	-34.412		10.0	KNOWN	-5.0
46	33	32	40	38	20.0	-1.007	-0.650	KNOWN	21.2		1.2
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	17.9		-42.1
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	17.0		-8.0
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	127.5		107.5
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	21.1		-48.9
51	38	37	36	0	60.0	0.000	0.000	KNOWN	20.6		-39.4
52	70	0	0	0	10.0	-1.596	-1.030	KNOWN	32.9		22.9
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	50.1		30.1
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	25.4		5.4
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	39.1		29.1

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0067	KNOWN	38.917	25.108
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	0.000	0.000
6	2	6	48.0	4960.0	86.0	0.0072	KNOWN	31.344	20.222
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	33.188	21.412
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	8.577	5.534
9	4	5	48.0	2000.0	120.0	0.0016	KNOWN	38.606	24.907
80	5	12	16.0	1260.0	75.0	0.5056	KNOWN	1.115	0.719
10	5	14	48.0	2080.0	120.0	0.0016	KNOWN	44.348	28.612
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.698	0.450
3	6	8	40.0	4160.0	67.0	0.0234	KNOWN	19.925	12.855
4	6	10	48.0	1920.0	86.0	0.0028	KNOWN	42.280	27.277
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.685	0.442
47	8	18	40.0	3200.0	67.0	0.0180	KNOWN	16.306	10.520
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	37.737	24.347
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.503	0.325
46	9	49	48.0	3350.0	85.0	0.0050	KNOWN	32.039	20.671
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	2.806	1.811
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.164	0.751
28	11	16	24.0	1650.0	30.0	0.4929	KNOWN	1.050	0.678
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	29.914	19.300
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	31.312	20.201
17	13	16	48.0	5120.0	120.0	0.0040	KNOWN	58.156	37.520
18	14	15	24.0	3680.0	65.0	0.2630	KNOWN	11.837	7.637
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	2.289	1.477
73	15	20	24.0	1040.0	66.0	0.0722	KNOWN	12.173	7.854
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	28.967	18.688
26	16	32	48.0	1950.0	120.0	0.0015	KNOWN	28.033	18.086
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	25.129	16.212
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	40.217	25.946
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	2.040	1.316
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	28.446	18.352
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	2.362	1.524
24	19	23	30.0	5600.0	50.0	0.2193	KNOWN	23.021	14.852
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	1.091	0.704
21	20	21	24.0	6720.0	66.0	0.4668	KNOWN	11.497	7.418
23	21	23	20.0	5120.0	60.0	1.0309	KNOWN	5.049	3.258
22	21	53	20.0	8470.0	70.0	1.2823	KNOWN	3.116	2.010
30	22	25	20.0	1040.0	60.0	0.2094	KNOWN	13.885	8.958
29	32	22	48.0	1920.0	120.0	0.0015	KNOWN	19.344	12.480
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	1.227	0.792
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	19.199	12.386
34	23	54	20.0	1760.0	55.0	0.4163	KNOWN	6.794	4.383
43	25	24	16.0	2560.0	64.0	1.3561	KNOWN	2.169	1.400
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	1.907	1.230
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	16.291	10.511
52	40	24	30.0	4960.0	80.0	0.0814	KNOWN	16.541	10.671
76	25	30	20.0	800.0	63.0	0.1472	KNOWN	11.034	7.119
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.380	0.245
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	14.261	9.200
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	12.704	8.196
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	4.827	3.114
77	27	43	16.0	1600.0	70.0	0.7181	KNOWN	4.106	2.649
66	29	28	30.0	2000.0	70.0	0.0420	KNOWN	28.461	18.362
67	28	43	30.0	1920.0	70.0	0.0403	KNOWN	23.122	14.918
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	23.062	14.879
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	3.491	2.252
82	31	30	16.0	3900.0	70.0	1.7503	KNOWN	4.359	2.812
27	32	31	20.0	1600.0	50.0	0.4514	KNOWN	6.271	4.046
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	8.848	5.708
60	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.780	1.149
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	11.946	7.707
59	36	35	16.0	2080.0	80.0	0.7292	KNOWN	3.028	1.954
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.638	1.057
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.708	1.747
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	15.475	9.984
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	1.461	0.943
53	40	38	30.0	640.0	80.0	0.0105	KNOWN	15.331	9.891
54	42	39	16.0	960.0	70.0	0.4309	KNOWN	5.487	3.540
51	41	40	30.0	1280.0	80.0	0.0210	KNOWN	34.135	22.022
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	4.764	3.074
68	43	55	30.0	1280.0	70.0	0.0269	KNOWN	26.717	17.237
41	44	45	30.0	2720.0	70.0	0.0572	KNOWN	21.400	13.806
69	55	44	30.0	1600.0	70.0	0.0336	KNOWN	24.407	15.747
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	29.627	19.114
39	47	45	16.0	2400.0	55.0	1.6828	KNOWN	2.309	1.489
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.265	0.816
72	47	48	20.0	5290.0	55.0	1.2512	KNOWN	0.838	0.540
37	51	47	20.0	800.0	55.0	0.1892	KNOWN	4.216	2.720
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	1.162	0.750
36	50	51	20.0	880.0	110.0	0.0577	KNOWN	2.951	1.904
79	54	50	20.0	1120.0	55.0	0.2649	KNOWN	4.547	2.934
70	55	52	16.0	3700.0	55.0	2.5943	KNOWN	1.596	1.030

TABLE SLS.07
STUDY DAY: YEAR 2020
FIRE NEAR NODE 45
TOTAL HEADMO FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	2	0	0	0	15.0	39.538	25.507		142.0	KNOWN	127.0
2	81	6	7	0	20.0	65.857	42.488		140.4	KNOWN	120.4
3	81	8	0	0	20.0	8.710	5.623		140.4	KNOWN	120.4
4	9	0	0	0	20.0	39.550	25.510		139.7	KNOWN	119.7
5	8	9	80	10	40.0	-1.720	-1.110	KNOWN	138.3		98.3
6	2	6	1	3	10.0	-8.742	-5.640	KNOWN	136.4		126.4
7	1	0	0	0	45.0	0.697	0.450	KNOWN	141.0		96.0
8	3	10	47	0	10.0	-4.309	-2.780	KNOWN	129.8		119.8
9	16	5	15	46	10.0	-4.541	-2.930	KNOWN	130.2		120.2
10	4	9	14	0	10.0	-1.889	-1.090	KNOWN	133.0		123.0
11	15	14	13	28	10.0	-3.426	-2.210	KNOWN	128.7		118.7
12	7	80	13	11	20.0	-3.224	-2.080	KNOWN	137.6		117.6
13	11	12	17	0	20.0	-3.038	-1.960	KNOWN	135.9		115.9
14	10	12	18	0	35.0	-1.193	-0.770	KNOWN	136.4		101.4
15	18	19	73	0	35.0	-1.953	-1.260	KNOWN	109.6		74.6
16	28	17	75	26	15.0	-2.216	-1.430	KNOWN	128.1		113.1
17	19	75	74	0	15.0	-1.550	-1.000	KNOWN	119.7		104.7
18	47	45	49	48	20.0	-2.495	-1.610	KNOWN	126.5		106.5
19	74	20	24	25	15.0	-0.837	-0.540	KNOWN	111.4		96.4
20	73	20	21	0	30.0	-2.038	-1.960	KNOWN	101.9		71.9
21	21	23	22	0	40.0	-3.333	-2.150	KNOWN	56.4		16.4
22	30	29	44	0	10.0	-4.231	-2.730	KNOWN	127.0		117.0
23	24	23	33	34	10.0	-2.077	-1.340	KNOWN	32.9		22.9
24	43	65	64	52	15.0	-0.511	-0.330	KNOWN	91.9		76.9
25	30	43	75	0	10.0	-0.682	-0.440	KNOWN	97.9		87.9
26	42	51	32	0	15.0	-1.938	-1.250	KNOWN	55.1		40.1
27	42	78	77	0	10.0	-0.341	-0.220	KNOWN	55.5		45.5
28	78	66	67	0	10.0	-0.511	-0.330	KNOWN	59.5		49.5
29	65	86	83	71	15.0	0.000	0.000	KNOWN	81.7		66.9
30	76	31	82	0	10.0	-1.131	-0.730	KNOWN	84.4		74.4
31	25	82	27	0	10.0	-0.821	-0.530	KNOWN	113.9		103.0
32	26	29	27	0	10.0	-2.418	-1.560	KNOWN	127.3		117.3
33	64	63	62	0	20.0	-2.677	-1.340	KNOWN	88.9		68.9
34	62	80	61	0	20.0	-1.318	-0.850	KNOWN	97.3		77.3
35	71	60	59	0	10.0	-1.318	-0.850	KNOWN	94.3		84.3
36	59	58	57	0	10.0	-1.318	-0.850	KNOWN	106.3		96.3
37	61	78	56	0	15.0	-1.891	-1.220	KNOWN	102.5		87.4
38	56	55	53	0	15.0	-1.318	-0.850	KNOWN	105.9		90.9
39	57	55	54	0	15.0	-1.318	-0.850	KNOWN	105.9		90.9
40	52	53	51	0	20.0	-2.263	-1.460	KNOWN	107.6		87.6
41	45	51	50	0	15.0	-1.318	-0.850	KNOWN	102.9		87.9
42	49	54	55	0	15.0	-1.318	-0.850	KNOWN	116.0		101.0
43	77	67	68	0	10.0	-0.511	-0.330	KNOWN	44.6		34.6
44	41	69	0	0	15.0	-3.007	-1.940	KNOWN	18.4		3.4
45	41	40	39	0	15.0	-56.412	-36.395		0.0	KNOWN	-15.0
46	33	32	42	38	20.0	-1.807	-1.650	KNOWN	12.4		-7.6
47	39	72	37	0	60.0	-1.069	-0.690	KNOWN	9.1		-50.9
48	72	35	0	0	25.0	-1.999	-1.290	KNOWN	8.4		-16.6
49	46	48	44	0	20.0	-4.820	-3.110	KNOWN	129.9		109.9
50	36	79	0	0	70.0	-1.596	-1.030	KNOWN	12.4		-57.6
51	38	37	36	0	60.0	0.000	0.000	KNOWN	11.9		-48.1
52	70	0	0	0	15.0	-1.996	-1.030	KNOWN	29.9		15.0
53	22	0	0	0	20.0	-3.115	-2.010	KNOWN	45.9		25.9
54	34	35	79	0	20.0	-1.085	-0.700	KNOWN	17.3		-2.7
55	68	69	70	0	10.0	-0.713	-0.460	KNOWN	32.0		22.0

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE RF(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
2	1	6	48.0	2880.0	67.0	0.0867	KNOWN	39.538	25.507
81	2	3	48.0	800.0	86.0	0.0012	KNOWN	0.000	0.000
6	2	8	48.0	4960.0	86.0	0.0072	KNOWN	32.028	20.663
7	2	12	48.0	1920.0	70.0	0.0041	KNOWN	33.860	21.845
8	3	5	30.0	1600.0	65.0	0.0386	KNOWN	8.723	5.628
9	4	5	48.0	2800.0	120.0	0.0016	KNOWN	39.995	25.545
80	5	12	16.0	1240.0	75.0	0.5056	KNOWN	1.149	0.741
10	5	14	48.0	2040.0	120.0	0.0010	KNOWN	45.359	29.264
1	7	6	16.0	11700.0	50.0	9.7854	KNOWN	0.696	0.450
3	8	9	40.0	4160.0	67.0	0.0234	KNOWN	20.357	13.134
4	8	10	48.0	1920.0	86.0	0.0028	KNOWN	43.103	27.847
16	9	8	16.0	592.0	40.0	0.7482	KNOWN	0.696	0.449
47	8	18	40.0	3216.0	67.0	0.0180	KNOWN	16.744	10.803
5	10	9	48.0	2240.0	86.0	0.0033	KNOWN	38.614	24.912
15	9	11	16.0	4000.0	40.0	5.0552	KNOWN	0.509	0.328
46	9	49	48.0	3360.0	85.0	0.0050	KNOWN	32.969	21.205
14	10	11	24.0	2720.0	35.0	0.6109	KNOWN	2.859	1.845
13	12	11	16.0	5120.0	40.0	6.4706	KNOWN	1.168	0.767
28	11	16	24.0	1520.0	30.0	0.4929	KNOWN	1.131	0.730
11	12	13	48.0	1440.0	70.0	0.0031	KNOWN	30.918	19.889
12	14	13	48.0	960.0	120.0	0.0008	KNOWN	32.076	20.694
17	14	16	48.0	5120.0	120.0	0.0040	KNOWN	59.002	38.453
18	14	15	24.0	3840.0	65.0	0.2030	KNOWN	12.126	7.825
19	17	15	16.0	3840.0	63.0	2.0943	KNOWN	2.330	1.503
73	19	20	24.0	1040.0	86.0	0.0722	KNOWN	12.505	8.068
75	16	17	30.0	950.0	80.0	0.0156	KNOWN	29.901	19.291
26	18	32	48.0	1950.0	120.0	0.0015	KNOWN	28.615	18.461
74	17	19	30.0	1200.0	80.0	0.0197	KNOWN	26.021	16.788
45	18	41	48.0	4550.0	120.0	0.0036	KNOWN	41.329	26.664
49	18	42	16.0	5600.0	70.0	2.5133	KNOWN	2.092	1.350
48	49	18	48.0	640.0	85.0	0.0010	KNOWN	29.172	18.821
20	19	20	16.0	3200.0	60.0	1.9101	KNOWN	2.367	1.540
24	19	23	30.0	5600.0	50.0	0.2194	KNOWN	23.938	15.444
25	31	19	16.0	2000.0	60.0	1.1938	KNOWN	1.141	0.736
21	20	21	24.0	5720.0	60.0	0.4668	KNOWN	11.854	7.648
23	21	23	20.0	5120.0	60.0	1.0209	KNOWN	5.406	3.488
22	21	93	20.0	8470.0	78.0	1.2823	KNOWN	3.115	2.010
30	22	25	20.0	1040.0	60.0	0.2694	KNOWN	14.380	9.265
29	32	22	48.0	1920.0	120.0	0.0615	KNOWN	19.717	12.721
44	22	49	48.0	3840.0	120.0	0.0030	KNOWN	1.125	0.726
33	23	46	30.0	4800.0	80.0	0.0788	KNOWN	20.178	13.018
34	23	64	20.0	1760.0	55.0	0.4162	KNOWN	7.096	4.574
43	23	24	16.0	2960.0	64.0	1.3961	KNOWN	2.220	1.434
65	24	29	16.0	3360.0	50.0	2.8102	KNOWN	1.985	1.280
64	24	33	36.0	2400.0	80.0	0.0162	KNOWN	16.887	10.895
52	49	24	30.0	4960.0	80.0	0.0814	KNOWN	17.159	11.071
76	25	30	20.0	880.0	63.0	0.1472	KNOWN	11.455	7.388
42	27	26	16.0	3200.0	60.0	1.9101	KNOWN	0.401	0.259
31	30	26	20.0	1600.0	78.0	0.1983	KNOWN	14.840	9.574
32	26	46	20.0	1760.0	60.0	0.3544	KNOWN	13.304	8.583
78	28	27	16.0	450.0	70.0	0.2020	KNOWN	5.031	3.246
77	27	43	16.0	1600.0	78.0	0.7181	KNOWN	4.288	2.767
66	29	28	30.0	2800.0	78.0	0.0420	KNOWN	29.688	19.149
67	28	43	30.0	1920.0	78.0	0.0403	KNOWN	24.137	15.573
63	33	29	30.0	800.0	65.0	0.0193	KNOWN	24.042	15.511
71	35	29	16.0	3200.0	80.0	1.1218	KNOWN	3.654	2.357
82	31	30	16.0	5900.0	70.0	1.7903	KNOWN	4.517	2.914
27	32	31	20.0	1600.0	50.0	0.4914	KNOWN	6.480	4.181
62	34	33	24.0	1920.0	65.0	0.1372	KNOWN	9.232	5.956
68	34	35	16.0	2800.0	80.0	0.9816	KNOWN	1.831	1.181
61	37	34	24.0	880.0	75.0	0.0483	KNOWN	12.380	7.987
59	36	35	16.0	2800.0	80.0	0.7202	KNOWN	3.141	2.026
58	37	36	16.0	2230.0	80.0	0.7818	KNOWN	1.675	1.081
57	39	36	16.0	2400.0	80.0	0.8414	KNOWN	2.783	1.795
56	38	37	30.0	1280.0	80.0	0.0210	KNOWN	15.947	10.288
55	39	38	30.0	560.0	80.0	0.0092	KNOWN	1.957	1.804
53	48	38	30.0	640.0	80.0	0.0105	KNOWN	15.707	10.134
54	42	39	16.0	960.0	70.0	0.4089	KNOWN	5.657	3.650
51	41	40	30.0	1760.0	80.0	0.0210	KNOWN	35.129	22.664
50	41	42	16.0	960.0	80.0	0.3365	KNOWN	4.882	3.150
60	43	55	30.0	1280.0	70.0	0.0269	KNOWN	27.914	18.009
41	44	45	30.0	2720.0	78.0	0.0572	KNOWN	22.595	14.578
69	93	44	30.0	1600.0	78.0	0.0336	KNOWN	25.605	16.519
40	46	45	30.0	1280.0	80.0	0.0210	KNOWN	31.305	20.196
39	47	45	16.0	2400.0	55.0	1.6926	KNOWN	2.481	1.601
38	46	51	20.0	1840.0	63.0	0.3385	KNOWN	1.145	0.739
72	47	48	20.0	5200.0	55.0	1.2512	KNOWN	9.793	6.312
37	91	47	20.0	800.0	55.0	0.1892	KNOWN	4.347	2.803
35	54	48	16.0	9100.0	55.0	6.3805	KNOWN	1.208	0.778
36	50	91	20.0	880.0	110.0	0.0577	KNOWN	3.203	2.066
79	34	50	20.0	1120.0	55.0	0.2049	KNOWN	4.799	3.096
70	55	52	16.0	3700.0	55.0	2.5942	KNOWN	1.596	1.030

Boston Water

APPENDIX PH

PARKER HILL

Charles A. Maguire & Associates

Boston Hartford Providence

Boston Water

APPENDIX PH1

COMPUTER ANALYSIS

Charles A. Maguire & Associates

Boston Hartford Providence

PH-1

Total Hydrant Discharge at 10 psig

NODE	CONNECTING PIPE NUMBS				ELEV FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT OF H20	STATUS HEAD	PRES HEAD FT OF H20
1	1	42	0	0	40·0	6·533	4·215	UNKWN	241·000	KNOWN	201·000
2	1	2	4	0	210·0	-8·902	-5·743	UNKWN	233·000	KNOWN	23·000
3	3	5	49	48	185·0	-0·155	-0·100	KNOWN	235·486	UNKWN	50·486
4	2	3	38	0	200·0	-0·480	-0·310	KNOWN	234·517	UNKWN	34·517
5	4	29	30	0	120·0	-0·008	-0·005	KNOWN	237·142	UNKWN	117·142
6	29	28	27	0	100·0	-0·008	-0·005	KNOWN	238·252	UNKWN	138·252
7	28	22	18	0	80·0	-0·062	-0·040	KNOWN	239·890	UNKWN	159·890
8	22	21	23	0	70·9	2·825	1·822	UNKWN	240·000	KNOWN	169·100
9	21	19	20	0	70·9	0·497	0·321	UNKWN	240·000	KNOWN	169·100
10	19	15	16	0	130·0	-0·008	-0·005	KNOWN	239·902	UNKWN	109·902
11	15	14	13	0	130·0	-0·008	-0·005	KNOWN	239·835	UNKWN	109·835
12	18	14	11	0	180·0	-0·008	-0·005	KNOWN	239·823	UNKWN	59·823
13	13	12	9	0	120·0	-0·008	-0·005	KNOWN	239·831	UNKWN	119·831
14	20	16	17	0	63·0	-0·008	-0·005	KNOWN	239·911	UNKWN	176·911
15	27	31	26	0	60·0	-0·008	-0·005	KNOWN	238·177	UNKWN	178·177
16	12	17	10	0	63·0	-0·008	-0·005	KNOWN	239·837	UNKWN	176·837
17	9	10	8	53	120·0	-0·008	-0·005	KNOWN	239·773	UNKWN	119·773
18	11	8	6	0	200·0	-0·002	-0·001	KNOWN	239·773	UNKWN	39·773
19	5	6	7	0	200·0	-0·003	-0·002	KNOWN	239·245	UNKWN	39·245
20	30	33	32	0	120·0	-0·008	-0·005	KNOWN	236·620	UNKWN	116·620
21	31	34	51	0	110·0	-0·008	-0·005	KNOWN	236·691	UNKWN	126·691
22	33	34	50	35	110·0	-0·008	-0·005	KNOWN	236·574	UNKWN	126·574
23	50	52	24	0	60·0	-0·008	-0·005	KNOWN	236·415	UNKWN	176·415
24	52	45	46	0	40·0	-0·015	-0·010	KNOWN	235·964	UNKWN	195·964
25	42	44	41	0	80·0	-0·008	-0·005	KNOWN	236·518	UNKWN	156·518
26	45	44	43	0	80·0	-0·015	-0·010	KNOWN	235·992	UNKWN	155·992
27	41	40	37	0	120·0	-0·008	-0·005	KNOWN	236·101	UNKWN	116·101
28	43	40	39	47	120·0	-0·008	-0·005	KNOWN	235·573	UNKWN	115·573
29	49	38	32	39	140·0	-0·003	-0·002	KNOWN	235·308	UNKWN	95·308
30	48	46	47	0	70·0	-0·047	-0·030	KNOWN	235·543	UNKWN	165·543
31	26	25	0	0	40·0	-0·008	-0·005	KNOWN	239·877	UNKWN	199·877
32	23	25	0	0	40·0	-0·008	-0·005	KNOWN	239·932	UNKWN	199·932
33	53	7	0	0	120·0	-0·008	-0·005	KNOWN	239·704	UNKWN	119·704
34	51	24	0	0	60·0	-0·008	-0·005	KNOWN	236·423	UNKWN	176·423
35	35	37	0	0	130·0	-0·008	-0·005	KNOWN	236·209	UNKWN	106·209

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	- DISCHARGE - CFS	MGD
1	1	2	20·0	1750·0	65·0	0·303868	KNOWN	7·848	3·773
42	1	25	8·0	600·0	65·0	9·031610	KNOWN	0·685	0·442
2	4	2	12·0	200·0	65·0	0·417907	KNOWN	2·006	1·294
4	5	2	12·0	1820·0	65·0	3·802952	KNOWN	1·047	0·676
3	3	4	12·0	380·0	65·0	0·794023	KNOWN	1·113	0·718
5	19	3	12·0	1100·0	65·0	2·298488	KNOWN	1·304	0·842
49	3	29	12·0	480·0	65·0	1·002976	KNOWN	0·393	0·253
46	30	3	16·0	750·0	65·0	0·386064	KNOWN	0·358	0·231
38	29	4	12·0	210·0	65·0	0·438802	KNOWN	1·374	0·887
29	6	5	12·0	230·0	65·0	0·480593	KNOWN	1·571	1·014
30	5	20	12·0	850·0	65·0	1·776104	KNOWN	0·517	0·333
28	7	6	12·0	320·0	65·0	0·668651	KNOWN	1·622	1·047
27	6	15	6·0	410·0	65·0	25·052403	KNOWN	0·043	0·028
22	8	7	24·0	270·0	65·0	0·019293	KNOWN	2·558	1·651
18	7	12	24·0	1200·0	65·0	0·085746	KNOWN	0·874	0·564
21	8	9	12·0	130·0	65·0	0·271639	KNOWN	0·000	0·000
23	8	32	16·0	1530·0	65·0	0·787570	KNOWN	0·266	0·172
19	9	10	12·0	700·0	65·0	1·462674	KNOWN	0·233	0·150
20	9	14	12·0	500·0	65·0	1·044767	KNOWN	0·264	0·171
15	10	11	12·0	450·0	65·0	0·940290	KNOWN	0·239	0·154
16	14	10	6·0	380·0	65·0	23·219300	KNOWN	0·015	0·009
14	11	12	12·0	180·0	65·0	0·376116	KNOWN	0·155	0·100
13	11	13	12·0	250·0	65·0	0·522384	KNOWN	0·077	0·050
11	12	18	24·0	680·0	65·0	0·048589	KNOWN	1·021	0·659
12	16	13	12·0	230·0	65·0	0·480593	KNOWN	0·096	0·062
9	13	17	12·0	780·0	65·0	1·629837	KNOWN	0·165	0·107
17	14	16	12·0	490·0	65·0	1·023872	KNOWN	0·242	0·156
31	15	21	8·0	1000·0	65·0	15·052683	KNOWN	0·286	0·185
26	31	15	6·0	360·0	65·0	21·997232	KNOWN	0·251	0·162
10	16	17	12·0	1200·0	65·0	2·507441	KNOWN	0·138	0·089
8	18	17	12·0	280·0	65·0	0·585070	KNOWN	0·014	0·009
53	17	33	12·0	290·0	65·0	0·605965	KNOWN	0·310	0·200
6	18	19	12·0	250·0	65·0	0·522384	KNOWN	1·006	0·649
7	33	19	8·0	280·0	65·0	4·214751	KNOWN	0·302	0·195
33	20	22	12·0	250·0	65·0	0·522384	KNOWN	0·269	0·174
32	20	29	8·0	1230·0	65·0	18·514800	KNOWN	0·239	0·154
34	21	22	8·0	230·0	65·0	3·462117	KNOWN	0·161	0·104
51	21	34	8·0	950·0	65·0	14·300049	KNOWN	0·117	0·075
50	22	23	12·0	1000·0	65·0	2·089534	KNOWN	0·249	0·160
35	22	35	8·0	620·0	65·0	9·332664	KNOWN	0·174	0·112
52	23	24	12·0	1500·0	65·0	3·134301	KNOWN	0·351	0·226
24	34	23	12·0	200·0	65·0	0·417907	KNOWN	0·117	0·075
45	26	24	6·0	310·0	65·0	18·942061	KNOWN	0·030	0·019
46	24	30	12·0	1300·0	65·0	2·716395	KNOWN	0·365	0·236
44	25	26	8·0	150·0	65·0	2·257902	KNOWN	0·455	0·294
41	25	27	8·0	450·0	65·0	6·773707	KNOWN	0·222	0·143
43	26	28	10·0	430·0	65·0	2·183387	KNOWN	0·410	0·264
40	27	28	8·0	210·0	65·0	3·161063	KNOWN	0·380	0·245
37	35	27	8·0	200·0	65·0	3·010537	KNOWN	0·166	0·107
39	28	29	12·0	220·0	65·0	0·459698	KNOWN	0·743	0·479
47	28	30	8·0	840·0	65·0	12·644254	KNOWN	0·038	0·025
25	32	31	12·0	320·0	65·0	0·668651	KNOWN	0·259	0·167

PH-2

Affect of Small Total Head Variation

NODE	CONNECTING PIPE NUMBS				ELEV FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT OF H20	STATUS HEAD	PRES HEAD FT OF H20
1	1	42	0	0	40·0	6·315	4·074	UNKWN	240·500	KNOWN	200·500
2	1	2	4	0	210·0	-8·715	-5·622	UNKWN	233·000	KNOWN	23·000
3	3	5	49	48	185·0	-0·155	-0·100	KNOWN	235·500	UNKWN	50·500
4	2	3	38	0	200·0	-0·480	-0·310	KNOWN	234·555	UNKWN	34·555
5	4	29	30	0	120·0	-0·008	-0·005	KNOWN	237·050	UNKWN	117·050
6	29	28	27	0	100·0	-0·008	-0·005	KNOWN	238·193	UNKWN	138·193
7	28	22	18	0	80·0	-0·062	-0·040	KNOWN	239·888	UNKWN	159·888
8	22	21	23	0	70·9	2·860	1·845	UNKWN	240·000	KNOWN	169·100
9	21	19	20	0	70·9	0·500	0·323	UNKWN	240·000	KNOWN	169·100
10	19	15	16	0	130·0	-0·008	-0·005	KNOWN	239·901	UNKWN	109·901
11	15	14	13	0	130·0	-0·008	-0·005	KNOWN	239·833	UNKWN	109·833
12	18	14	11	0	180·0	-0·008	-0·005	KNOWN	239·821	UNKWN	59·821
13	13	12	9	0	120·0	-0·008	-0·005	KNOWN	239·829	UNKWN	119·829
14	20	16	17	0	63·0	-0·008	-0·005	KNOWN	239·910	UNKWN	176·910
15	27	31	26	0	60·0	-0·008	-0·005	KNOWN	238·103	UNKWN	178·103
16	12	17	10	0	63·0	-0·008	-0·005	KNOWN	239·835	UNKWN	176·835
17	9	10	8	53	120·0	-0·008	-0·005	KNOWN	239·770	UNKWN	119·770
18	11	8	6	0	200·0	-0·008	-0·005	KNOWN	239·770	UNKWN	39·770
19	5	6	7	0	200·0	-0·003	-0·002	KNOWN	239·245	UNKWN	39·245
20	30	33	32	0	120·0	-0·008	-0·005	KNOWN	236·453	UNKWN	116·453
21	31	34	51	0	110·0	-0·008	-0·005	KNOWN	236·520	UNKWN	126·520
22	33	34	50	35	110·0	-0·008	-0·005	KNOWN	236·385	UNKWN	126·385
23	50	52	24	0	60·0	-0·008	-0·005	KNOWN	236·251	UNKWN	176·251
24	52	45	46	0	40·0	-0·015	-0·010	KNOWN	235·855	UNKWN	195·855
25	42	44	41	0	80·0	-0·008	-0·005	KNOWN	236·238	UNKWN	156·238
26	45	44	43	0	80·0	-0·015	-0·010	KNOWN	235·856	UNKWN	155·856
27	41	40	37	0	120·0	-0·008	-0·005	KNOWN	235·614	UNKWN	115·614
28	43	40	39	47	120·0	-0·008	-0·005	KNOWN	235·525	UNKWN	115·525
29	49	38	32	39	140·0	-0·003	-0·002	KNOWN	235·390	UNKWN	95·390
30	48	46	47	0	70·0	-0·047	-0·030	KNOWN	235·531	UNKWN	165·531
31	26	25	0	0	40·0	-0·008	-0·005	KNOWN	239·873	UNKWN	199·873
32	23	25	0	0	40·0	-0·008	-0·005	KNOWN	239·929	UNKWN	199·929
33	53	7	0	0	120·0	-0·008	-0·005	KNOWN	239·701	UNKWN	119·701
34	51	24	0	0	60·0	-0·008	-0·005	KNOWN	236·258	UNKWN	176·258
35	35	37	36	0	130·0	-0·008	-0·005	KNOWN	235·552	UNKWN	105·552

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	- DISCHARGE - CFS	MGD
1	1	2	20·0	1750·0	65·0	0·303868	KNOWN	5·648	3·644
42	1	25	8·0	600·0	65·0	9·031610	KNOWN	0·667	0·430
2	4	2	12·0	200·0	65·0	0·417907	KNOWN	2·033	1·312
4	5	2	12·0	1820·0	65·0	3·802952	KNOWN	1·035	0·667
3	3	4	12·0	380·0	65·0	0·794023	KNOWN	1·098	0·709
5	19	3	12·0	1100·0	65·0	2·298488	KNOWN	1·302	0·840
49	3	29	12·0	480·0	65·0	1·002976	KNOWN	0·303	0·195
46	30	3	16·0	750·0	65·0	0·386064	KNOWN	0·255	0·164
38	29	4	12·0	210·0	65·0	0·438802	KNOWN	1·415	0·913
29	6	5	12·0	230·0	65·0	0·480593	KNOWN	1·597	1·030
30	5	20	12·0	850·0	65·0	1·776104	KNOWN	0·555	0·358
28	7	6	12·0	320·0	65·0	0·668651	KNOWN	1·653	1·066
27	6	15	6·0	410·0	65·0	25·052403	KNOWN	0·048	0·031
22	8	7	24·0	270·0	65·0	0·019293	KNOWN	2·589	1·670
18	7	12	24·0	1200·0	65·0	0·085746	KNOWN	0·872	0·563
21	8	9	12·0	130·0	65·0	0·271639	KNOWN	0·000	0·000
23	8	32	16·0	1530·0	65·0	0·787570	KNOWN	0·272	0·175
19	9	10	12·0	700·0	65·0	1·462674	KNOWN	0·234	0·151
20	9	14	12·0	500·0	65·0	1·044767	KNOWN	0·266	0·172
15	10	11	12·0	450·0	65·0	0·940290	KNOWN	0·241	0·156
16	14	10	6·0	380·0	65·0	23·219300	KNOWN	0·015	0·010
14	11	12	12·0	180·0	65·0	0·376116	KNOWN	0·155	0·100
13	11	13	12·0	250·0	65·0	0·522384	KNOWN	0·076	0·049
11	12	18	24·0	680·0	65·0	0·048589	KNOWN	1·025	0·662
12	16	13	12·0	230·0	65·0	0·460593	KNOWN	0·097	0·063
9	13	17	12·0	780·0	65·0	1·629837	KNOWN	0·166	0·107
17	14	16	12·0	490·0	65·0	1·023872	KNOWN	0·244	0·157
31	15	21	8·0	1000·0	65·0	15·052683	KNOWN	0·296	0·191
26	31	15	6·0	360·0	65·0	21·997232	KNOWN	0·256	0·165
10	16	17	12·0	1200·0	65·0	2·507441	KNOWN	0·139	0·090
8	18	17	12·0	280·0	65·0	0·585070	KNOWN	0·011	0·007
53	17	33	12·0	290·0	65·0	0·605965	KNOWN	0·309	0·199
6	18	19	12·0	250·0	65·0	0·522384	KNOWN	1·003	0·647
7	33	19	8·0	280·0	65·0	4·214751	KNOWN	0·301	0·194
33	20	22	12·0	250·0	65·0	0·522384	KNOWN	0·333	0·215
32	20	29	8·0	1230·0	65·0	18·514800	KNOWN	0·214	0·138
34	21	22	8·0	230·0	65·0	3·462117	KNOWN	0·173	0·112
51	21	34	8·0	950·0	65·0	14·300049	KNOWN	0·115	0·074
50	22	23	12·0	1000·0	65·0	2·089534	KNOWN	0·227	0·147
35	22	35	8·0	620·0	65·0	9·332664	KNOWN	0·271	0·175
52	23	24	12·0	1500·0	65·0	3·134301	KNOWN	0·327	0·211
24	34	23	12·0	200·0	65·0	0·417907	KNOWN	0·108	0·069
45	26	24	6·0	310·0	65·0	18·942061	KNOWN	0·006	0·004
46	24	30	12·0	1300·0	65·0	2·716395	KNOWN	0·317	0·205
44	25	26	8·0	150·0	65·0	2·257902	KNOWN	0·383	0·247
41	25	27	8·0	450·0	65·0	6·773707	KNOWN	0·276	0·178
43	26	28	10·0	430·0	65·0	2·183387	KNOWN	0·362	0·233
40	27	28	8·0	210·0	65·0	3·161063	KNOWN	0·145	0·094
37	27	35	8·0	200·0	65·0	3·010537	KNOWN	0·123	0·079
39	28	29	12·0	220·0	65·0	0·459698	KNOWN	0·515	0·332
47	30	28	8·0	840·0	65·0	12·644254	KNOWN	0·016	0·010
36	35	29	12·0	450·0	65·0	0·940290	KNOWN	0·386	0·249
25	32	31	12·0	320·0	65·0	0·668651	KNOWN	0·264	0·170

PH-3

Total Hydrant Discharge at 0 psig

NODE	CONNECTING PIPE NUMBS	ELEV FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT OF H2O	STATUS HEAD	PRES HEAD FT OF H2O
1	1 42 0 0	40·0	10·750	6·936	UNKWN	230·300	KNOWN	190·300
2	1 2 4 0	210·0	-15·476	-9·985	UNKWN	210·000	KNOWN	0·000
3	3 5 49 48	185·0	-0·155	-0·100	KNOWN	218·023	UNKWN	33·023
4	2 3 38 0	200·0	-0·480	-0·310	KNOWN	215·309	UNKWN	15·309
5	4 29 30 0	120·0	-0·008	-0·005	KNOWN	222·014	UNKWN	102·014
6	29 28 27 0	100·0	-0·008	-0·005	KNOWN	225·210	UNKWN	125·210
7	28 22 18 0	80·0	-0·062	-0·040	KNOWN	229·900	UNKWN	149·900
8	22 21 23 0	70·9	5·023	3·240	UNKWN	230·200	KNOWN	159·300
9	21 19 20 0	70·9	0·662	0·427	UNKWN	230·190	KNOWN	159·290
10	19 15 16 0	130·0	-0·008	-0·005	KNOWN	229·935	UNKWN	99·935
11	15 14 13 0	130·0	-0·008	-0·005	KNOWN	229·758	UNKWN	99·758
12	18 14 11 0	180·0	-0·008	-0·005	KNOWN	229·725	UNKWN	49·725
13	13 12 9 0	120·0	-0·008	-0·005	KNOWN	229·747	UNKWN	109·747
14	20 16 17 0	63·0	-0·008	-0·005	KNOWN	229·960	UNKWN	166·960
15	27 31 26 0	60·0	-0·008	-0·005	KNOWN	225·012	UNKWN	167·012
16	12 17 10 0	63·0	-0·008	-0·005	KNOWN	229·764	UNKWN	166·764
17	9 10 8 53	120·0	-0·008	-0·005	KNOWN	229·590	UNKWN	109·590
18	11 8 6 0	200·0	-0·008	-0·005	KNOWN	229·590	UNKWN	29·590
19	5 6 7 0	200·0	-0·003	-0·002	KNOWN	225·169	UNKWN	25·169
20	30 33 32 0	120·0	-0·008	-0·005	KNOWN	220·513	UNKWN	100·513
21	31 34 51 0	110·0	-0·008	-0·005	KNOWN	220·725	UNKWN	110·725
22	33 34 50 35	110·0	-0·008	-0·005	KNOWN	220·345	UNKWN	110·345
23	50 52 24 0	60·0	-0·008	-0·005	KNOWN	220·003	UNKWN	160·003
24	52 45 46 0	40·0	-0·015	-0·010	KNOWN	218·942	UNKWN	178·942
25	42 44 41 0	80·0	-0·008	-0·005	KNOWN	219·861	UNKWN	139·861
26	45 44 43 0	80·0	-0·015	-0·010	KNOWN	218·937	UNKWN	138·937
27	41 40 37 0	120·0	-0·008	-0·005	KNOWN	218·278	UNKWN	98·278
28	43 40 39 47	120·0	-0·008	-0·005	KNOWN	218·062	UNKWN	98·062
29	49 38 32 39	140·0	-0·003	-0·002	KNOWN	217·676	UNKWN	77·676
30	48 46 47 0	70·0	-0·047	-0·030	KNOWN	218·105	UNKWN	148·105
31	26 25 0 0	40·0	-0·008	-0·005	KNOWN	229·863	UNKWN	189·863
32	23 25 0 0	40·0	-0·008	-0·005	KNOWN	230·015	UNKWN	190·015
33	53 7 0 0	120·0	-0·008	-0·005	KNOWN	229·407	UNKWN	109·407
34	51 24 0 0	60·0	-0·008	-0·005	KNOWN	220·022	UNKWN	160·022
35	35 37 36 0	130·0	-0·008	-0·005	KNOWN	218·114	UNKWN	88·114

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	- DISCHARGE - CFS	MGD
1	1	2	20·0	1750·0	65·0	0·303868	KNOWN	9·669	6·238
42	1	25	8·0	600·0	65·0	9·031610	KNOWN	1·081	0·698
2	4	2	12·0	200·0	65·0	0·417907	KNOWN	3·946	2·546
4	5	2	12·0	1820·0	65·0	3·802952	KNOWN	1·861	1·201
3	3	4	12·0	380·0	65·0	0·794023	KNOWN	1·942	1·253
5	19	3	12·0	1100·0	65·0	2·298468	KNOWN	2·230	1·438
49	3	29	12·0	480·0	65·0	1·002976	KNOWN	0·564	0·364
48	30	3	16·0	750·0	65·0	0·386064	KNOWN	0·432	0·278
38	29	4	12·0	210·0	65·0	0·438802	KNOWN	2·484	1·603
29	6	5	12·0	230·0	65·0	0·480593	KNOWN	2·782	1·795
30	5	20	12·0	850·0	65·0	1·776104	KNOWN	0·913	0·589
28	7	6	12·0	320·0	65·0	0·668651	KNOWN	2·863	1·847
27	6	15	6·0	410·0	65·0	25·052403	KNOWN	0·073	0·047
22	8	7	24·0	270·0	65·0	0·019293	KNOWN	4·397	2·837
18	7	12	24·0	1200·0	65·0	0·085746	KNOWN	1·472	0·950
21	8	9	12·0	130·0	65·0	0·271639	KNOWN	0·168	0·108
23	8	32	16·0	1530·0	65·0	0·787570	KNOWN	0·457	0·295
19	9	10	12·0	700·0	65·0	1·462674	KNOWN	0·389	0·251
20	9	14	12·0	500·0	65·0	1·044767	KNOWN	0·442	0·285
15	10	11	12·0	450·0	65·0	0·940290	KNOWN	0·406	0·262
16	14	10	6·0	380·0	65·0	23·219300	KNOWN	0·025	0·016
14	11	12	12·0	180·0	65·0	0·376116	KNOWN	0·269	0·174
13	11	13	12·0	250·0	65·0	0·522384	KNOWN	0·122	0·079
11	12	18	24·0	680·0	65·0	0·048589	KNOWN	1·736	1·120
12	16	13	12·0	230·0	65·0	0·480593	KNOWN	0·164	0·106
9	13	17	12·0	780·0	65·0	1·629837	KNOWN	0·283	0·183
17	14	16	12·0	490·0	65·0	1·023872	KNOWN	0·409	0·264
31	15	21	8·0	1000·0	65·0	15·052683	KNOWN	0·508	0·327
26	31	15	6·0	360·0	65·0	21·997232	KNOWN	0·442	0·285
10	16	17	12·0	1200·0	65·0	2·507441	KNOWN	0·237	0·153
8	18	17	12·0	280·0	65·0	0·585070	KNOWN	0·011	0·007
53	17	33	12·0	290·0	65·0	0·605965	KNOWN	0·524	0·338
6	18	19	12·0	250·0	65·0	0·522384	KNOWN	1·717	1·108
7	33	19	8·0	280·0	65·0	4·214751	KNOWN	0·516	0·333
33	20	22	12·0	250·0	65·0	0·522384	KNOWN	0·542	0·350
32	20	29	8·0	1230·0	65·0	18·514800	KNOWN	0·363	0·234
34	21	22	8·0	230·0	65·0	3·462117	KNOWN	0·303	0·196
51	21	34	8·0	950·0	65·0	14·300049	KNOWN	0·197	0·127
50	22	23	12·0	1000·0	65·0	2·089534	KNOWN	0·376	0·243
35	22	35	8·0	620·0	65·0	9·332664	KNOWN	0·462	0·298
52	23	24	12·0	1500·0	65·0	3·134301	KNOWN	0·557	0·359
24	34	23	12·0	200·0	65·0	0·417907	KNOWN	0·189	0·122
45	24	26	6·0	310·0	65·0	18·942061	KNOWN	0·012	0·008
46	24	30	12·0	1300·0	65·0	2·716395	KNOWN	0·530	0·342
44	25	26	8·0	150·0	65·0	2·257902	KNOWN	0·617	0·398
41	25	27	8·0	450·0	65·0	6·773707	KNOWN	0·456	0·294
43	26	28	10·0	430·0	65·0	2·183387	KNOWN	0·614	0·396
40	27	28	8·0	210·0	65·0	3·161063	KNOWN	0·240	0·155
37	27	35	8·0	200·0	65·0	3·010537	KNOWN	0·208	0·134
39	28	29	12·0	220·0	65·0	0·459698	KNOWN	0·898	0·579
47	30	28	8·0	840·0	65·0	12·644254	KNOWN	0·052	0·033
36	35	29	12·0	450·0	65·0	0·940290	KNOWN	0·662	0·427
25	32	31	12·0	320·0	65·0	0·668651	KNOWN	0·450	0·290

PH-4

Effect of Pipe Rehabilitation

NODE	CONNECTING PIPE NUMBS	ELEV FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT OF H2O	STATUS HEAD	PRES HEAD FT OF H2O
1	1 42 0 0	40·0	6·661	4·297	UNKWN	233·300	KNOWN	193·300
2	1 2 56 0	210·0	-1·671	-1·078	KNOWN	230·862	UNKWN	20·862
3	3 49 48 5	185·0	-2·135	-1·378	KNOWN	230·088	UNKWN	45·088
4	2 3 38 0	200·0	-0·930	-0·600	KNOWN	230·368	UNKWN	30·368
5	29 30 4 0	120·0	-0·023	-0·015	KNOWN	230·734	UNKWN	110·734
6	29 28 27 0	100·0	-0·023	-0·015	KNOWN	231·576	UNKWN	131·576
7	28 22 18 0	80·0	-0·186	-0·120	KNOWN	232·828	UNKWN	152·828
8	22 21 23 0	70·9	3·524	2·274	UNKWN	233·000	KNOWN	162·100
9	21 19 20 0	70·9	0·792	0·511	UNKWN	233·000	KNOWN	162·100
10	19 15 16 0	130·0	-0·023	-0·015	KNOWN	232·770	UNKWN	102·770
11	15 14 13 0	130·0	-0·023	-0·015	KNOWN	232·624	UNKWN	102·624
12	18 14 11 0	180·0	-0·023	-0·015	KNOWN	232·608	UNKWN	52·608
13	13 12 9 0	120·0	-0·023	-0·015	KNOWN	232·606	UNKWN	112·606
14	20 16 17 0	63·0	-0·023	-0·015	KNOWN	232·787	UNKWN	169·787
15	27 31 26 0	60·0	-0·023	-0·015	KNOWN	231·546	UNKWN	171·546
16	12 17 10 0	63·0	-0·023	-0·015	KNOWN	232·617	UNKWN	169·617
17	9 10 8 53	120·0	-0·023	-0·015	KNOWN	232·461	UNKWN	112·461
18	11 8 6 0	200·0	-0·465	-0·300	KNOWN	232·460	UNKWN	32·460
19	6 7 59 0	200·0	-0·009	-0·006	KNOWN	231·498	UNKWN	31·498
20	30 33 32 0	120·0	-0·023	-0·015	KNOWN	230·562	UNKWN	110·562
21	31 34 51 0	110·0	-0·023	-0·015	KNOWN	230·609	UNKWN	120·609
22	33 34 50 35	110·0	-0·023	-0·015	KNOWN	230·541	UNKWN	120·541
23	50 52 24 0	60·0	-0·023	-0·015	KNOWN	230·471	UNKWN	170·471
24	52 45 46 0	40·0	-0·047	-0·030	KNOWN	230·318	UNKWN	190·318
25	42 44 41 0	80·0	-0·023	-0·015	KNOWN	230·709	UNKWN	150·709
26	45 44 43 0	80·0	-0·047	-0·030	KNOWN	230·464	UNKWN	150·464
27	41 40 37 0	120·0	-0·023	-0·015	KNOWN	230·410	UNKWN	110·410
28	43 40 39 47	120·0	-0·023	-0·015	KNOWN	230·371	UNKWN	110·371
29	49 38 32 39	140·0	-0·009	-0·006	KNOWN	230·359	UNKWN	90·359
30	48 46 47 0	70·0	0·046	0·030	KNOWN	230·153	UNKWN	160·153
31	26 25 0 0	40·0	-0·023	-0·015	KNOWN	232·883	UNKWN	192·883
32	23 25 0 0	40·0	-0·023	-0·015	KNOWN	232·932	UNKWN	192·932
33	53 7 0 0	120·0	-0·023	-0·015	KNOWN	232·329	UNKWN	112·329
34	51 24 0 0	60·0	-0·023	-0·015	KNOWN	230·473	UNKWN	170·473
35	35 37 36 0	130·0	-0·023	-0·015	KNOWN	230·389	UNKWN	100·389
36	5 57 0 0	185·0	-1·671	-1·078	KNOWN	230·091	UNKWN	45·091
37	57 58 0 0	180·0	0·000	0·000	KNOWN	230·434	UNKWN	50·434
38	59 58 0 0	175·0	0·000	0·000	KNOWN	230·949	UNKWN	55·949
39	4 54 0 0	180·0	0·000	0·000	KNOWN	228·574	UNKWN	48·574
40	56 55 0 0	212·0	-1·671	-1·078	KNOWN	228·136	UNKWN	16·136
41	54 55 0 0	212·0	-1·671	-1·078	KNOWN	227·891	UNKWN	15·891

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	- DISCHARGE - CFS	MGD
1	1	2	20·0	1750·0	130·0	0·084291	KNOWN	6·153	3·970
42	1	25	8·0	600·0	65·0	9·031610	KNOWN	0·510	0·329
2	2	4	12·0	200·0	130·0	0·115924	KNOWN	2·187	1·411
56	2	40	12·0	280·0	65·0	0·585070	KNOWN	2·295	1·481
3	4	3	12·0	380·0	130·0	0·220256	KNOWN	1·137	0·733
49	29	3	12·0	480·0	65·0	1·002976	KNOWN	0·493	0·318
48	30	3	16·0	750·0	65·0	0·386064	KNOWN	0·379	0·245
5	36	3	12·0	180·0	130·0	0·104332	KNOWN	0·126	0·081
38	4	29	12·0	210·0	65·0	0·438802	KNOWN	0·120	0·077
29	6	5	12·0	230·0	65·0	0·480593	KNOWN	1·354	0·874
30	5	20	12·0	850·0	65·0	1·776104	KNOWN	0·283	0·183
4	5	39	12·0	950·0	65·0	1·985053	KNOWN	1·047	0·675
28	7	6	12·0	320·0	65·0	0·668651	KNOWN	1·403	0·905
27	6	15	6·0	410·0	65·0	25·052403	KNOWN	0·026	0·017
22	8	7	24·0	270·0	65·0	0·019293	KNOWN	3·257	2·101
18	7	12	24·0	1200·0	65·0	0·085746	KNOWN	1·666	1·075
21	8	9	12·0	130·0	65·0	0·271639	KNOWN	0·000	0·000
23	8	32	16·0	1530·0	65·0	0·787570	KNOWN	0·267	0·172
19	9	10	12·0	700·0	65·0	1·462674	KNOWN	0·369	0·238
20	9	14	12·0	500·0	65·0	1·044767	KNOWN	0·423	0·273
15	10	11	12·0	450·0	65·0	0·940290	KNOWN	0·366	0·236
16	14	10	6·0	380·0	65·0	23·219300	KNOWN	0·021	0·013
14	11	12	12·0	180·0	65·0	0·376116	KNOWN	0·181	0·117
13	11	13	12·0	250·0	65·0	0·522384	KNOWN	0·161	0·104
11	12	18	24·0	680·0	65·0	0·048589	KNOWN	1·824	1·177
12	16	13	12·0	230·0	65·0	0·480593	KNOWN	0·133	0·086
9	13	17	12·0	780·0	65·0	1·629837	KNOWN	0·271	0·175
17	14	16	12·0	490·0	65·0	1·023872	KNOWN	0·379	0·245
31	15	21	8·0	1000·0	65·0	15·052683	KNOWN	0·223	0·144
26	31	15	6·0	360·0	65·0	21·997232	KNOWN	0·220	0·142
10	16	17	12·0	1200·0	65·0	2·507441	KNOWN	0·224	0·144
8	17	18	12·0	280·0	65·0	0·585070	KNOWN	0·032	0·020
53	17	33	12·0	290·0	65·0	0·605965	KNOWN	0·439	0·283
6	18	19	12·0	250·0	65·0	0·522384	KNOWN	1·390	0·897
7	33	19	8·0	280·0	65·0	4·214751	KNOWN	0·416	0·268
59	19	38	12·0	320·0	130·0	0·135479	KNOWN	1·797	1·159
33	20	22	12·0	250·0	65·0	0·522384	KNOWN	0·173	0·112
32	20	29	8·0	1230·0	65·0	18·514800	KNOWN	0·087	0·056
34	21	22	8·0	230·0	65·0	3·462117	KNOWN	0·119	0·077
51	21	34	8·0	950·0	65·0	14·300049	KNOWN	0·081	0·052
50	22	23	12·0	1000·0	65·0	2·089534	KNOWN	0·161	0·104
35	22	35	8·0	620·0	65·0	9·332664	KNOWN	0·109	0·070
52	23	24	12·0	1500·0	65·0	3·134301	KNOWN	0·195	0·126
24	34	23	12·0	200·0	65·0	0·417907	KNOWN	0·058	0·037
45	26	24	6·0	310·0	65·0	18·942061	KNOWN	0·072	0·047
46	24	30	12·0	1300·0	65·0	2·716395	KNOWN	0·221	0·143
44	25	26	8·0	150·0	65·0	2·257902	KNOWN	0·301	0·194
41	25	27	8·0	450·0	65·0	6·773707	KNOWN	0·185	0·120
43	26	28	10·0	430·0	65·0	2·183387	KNOWN	0·182	0·118
40	27	28	8·0	210·0	65·0	3·161063	KNOWN	0·093	0·060
37	27	35	8·0	200·0	65·0	3·010537	KNOWN	0·069	0·045
39	28	29	12·0	220·0	65·0	0·459698	KNOWN	0·140	0·090
47	28	30	8·0	840·0	65·0	12·644254	KNOWN	0·112	0·072
36	35	29	12·0	450·0	65·0	0·940290	KNOWN	0·154	0·100
25	32	31	12·0	320·0	65·0	0·668651	KNOWN	0·244	0·157
57	37	36	12·0	200·0	130·0	0·115924	KNOWN	1·797	1·159
58	38	37	12·0	300·0	130·0	0·173886	KNOWN	1·797	1·159
54	39	41	12·0	300·0	65·0	0·626860	KNOWN	1·047	0·675
55	40	41	12·0	280·0	65·0	0·585070	KNOWN	0·624	0·403

PH-5

Total Hydrant Discharge = 3,760 gpm

NODE	CONNECTING PIPE NUMBS				ELEV FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT OF H2O	STATUS HEAD	PRES HEAD FT OF H2O
1	1	42	0	0	40.0	3.876	3.791	UNKWN	233.300	KNOWN	193.300
2	1	2	56	0	210.0	-1.671	-1.078	KNOWN	227.129	UNKWN	17.129
3	3	49	48	5	185.0	-2.135	-1.378	KNOWN	226.037	UNKWN	41.037
4	2	3	38	0	200.0	-0.930	-0.600	KNOWN	226.438	UNKWN	26.438
5	29	30	4	0	120.0	-0.023	-0.015	KNOWN	228.598	UNKWN	108.598
6	29	28	27	0	100.0	-0.023	-0.015	KNOWN	230.256	UNKWN	130.256
7	28	22	18	0	80.0	-0.186	-0.120	KNOWN	232.762	UNKWN	152.762
8	22	21	23	0	70.9	4.251	2.742	UNKWN	233.000	KNOWN	162.100
9	21	19	20	0	70.9	0.850	0.549	UNKWN	233.000	KNOWN	162.100
10	19	15	16	0	130.0	-0.023	-0.015	KNOWN	232.736	UNKWN	102.736
11	15	14	13	0	130.0	-0.023	-0.015	KNOWN	232.566	UNKWN	102.566
12	18	14	11	0	180.0	-0.023	-0.015	KNOWN	232.544	UNKWN	52.544
13	13	12	9	0	120.0	-0.023	-0.015	KNOWN	232.550	UNKWN	112.550
14	20	16	17	0	63.0	-0.023	-0.015	KNOWN	232.758	UNKWN	169.758
15	27	31	26	0	60.0	-0.023	-0.015	KNOWN	230.093	UNKWN	170.093
16	12	17	10	0	63.0	-0.023	-0.015	KNOWN	232.564	UNKWN	169.564
17	9	10	8	53	120.0	-0.023	-0.015	KNOWN	232.394	UNKWN	112.394
18	11	8	6	0	200.0	-0.465	-0.300	KNOWN	232.392	UNKWN	32.392
19	6	7	59	0	200.0	-0.009	-0.006	KNOWN	231.382	UNKWN	31.382
20	30	33	32	0	120.0	-0.023	-0.015	KNOWN	227.714	UNKWN	107.714
21	31	34	51	0	110.0	-0.023	-0.015	KNOWN	227.772	UNKWN	117.772
22	33	34	50	35	110.0	-0.023	-0.015	KNOWN	227.603	UNKWN	117.603
23	50	52	24	0	60.0	-0.023	-0.015	KNOWN	227.362	UNKWN	167.362
24	52	45	46	0	40.0	-0.047	-0.030	KNOWN	226.761	UNKWN	186.761
25	42	44	41	0	80.0	-0.023	-0.015	KNOWN	227.428	UNKWN	147.428
26	45	44	43	0	80.0	-0.047	-0.030	KNOWN	226.879	UNKWN	146.879
27	41	40	37	0	120.0	-0.023	-0.015	KNOWN	226.685	UNKWN	106.685
28	43	40	39	47	120.0	-0.023	-0.015	KNOWN	226.557	UNKWN	106.557
29	49	38	32	39	140.0	-0.009	-0.006	KNOWN	226.487	UNKWN	86.487
30	48	46	47	0	70.0	0.046	0.030	KNOWN	226.197	UNKWN	156.197
31	26	25	0	0	40.0	-0.023	-0.015	KNOWN	232.783	UNKWN	192.783
32	23	25	0	0	40.0	-0.023	-0.015	KNOWN	232.876	UNKWN	192.876
33	53	7	0	0	120.0	-0.023	-0.015	KNOWN	232.255	UNKWN	112.255
34	51	24	0	0	60.0	-0.023	-0.015	KNOWN	227.371	UNKWN	167.371
35	35	37	36	0	130.0	-0.023	-0.015	KNOWN	226.639	UNKWN	96.639
36	5	57	0	0	185.0	-1.671	-1.078	KNOWN	226.052	UNKWN	41.052
37	57	58	0	0	180.0	0.000	0.000	KNOWN	227.352	UNKWN	47.352
38	59	58	0	0	175.0	0.000	0.000	KNOWN	229.302	UNKWN	54.302
39	4	54	0	0	180.0	0.000	0.000	KNOWN	225.632	UNKWN	45.632
40	56	55	0	0	212.0	-1.671	-1.078	KNOWN	224.818	UNKWN	12.818
41	54	55	0	0	212.0	-1.671	-1.078	KNOWN	224.696	UNKWN	12.696

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	DISCHARGE CFS	DISCHARGE MGD
1	1	2	20.0	1750.0	65.0	0.303868	KNOWN	5.083	3.280
42	1	25	8.0	600.0	65.0	9.031610	KNOWN	0.793	0.511
2	2	4	12.0	200.0	65.0	0.417907	KNOWN	1.312	0.847
56	2	40	12.0	280.0	65.0	0.585070	KNOWN	2.100	1.355
3	4	3	12.0	380.0	65.0	0.794023	KNOWN	0.691	0.446
49	29	3	12.0	480.0	65.0	1.002976	KNOWN	0.649	0.419
48	30	3	16.0	750.0	65.0	0.386064	KNOWN	0.621	0.401
5	36	3	12.0	180.0	65.0	0.376116	KNOWN	0.175	0.113
38	29	4	12.0	210.0	65.0	0.438802	KNOWN	0.309	0.199
29	6	5	12.0	230.0	65.0	0.480593	KNOWN	1.952	1.259
30	5	20	12.0	850.0	65.0	1.776104	KNOWN	0.686	0.443
4	5	39	12.0	950.0	65.0	1.985058	KNOWN	1.242	0.801
28	7	6	12.0	320.0	65.0	0.668651	KNOWN	2.041	1.317
27	6	15	6.0	410.0	65.0	25.052403	KNOWN	0.066	0.043
22	8	7	24.0	270.0	65.0	0.019293	KNOWN	3.882	2.505
18	7	12	24.0	1200.0	65.0	0.085746	KNOWN	1.656	1.068
21	8	9	12.0	130.0	65.0	0.271639	KNOWN	0.000	0.000
23	8	32	16.0	1530.0	65.0	0.787570	KNOWN	0.368	0.237
19	9	10	12.0	700.0	65.0	1.462674	KNOWN	0.397	0.256
20	9	14	12.0	500.0	65.0	1.044767	KNOWN	0.454	0.293
15	10	11	12.0	450.0	65.0	0.940290	KNOWN	0.397	0.256
16	14	10	6.0	380.0	65.0	23.219300	KNOWN	0.023	0.015
14	11	12	12.0	180.0	65.0	0.376116	KNOWN	0.218	0.141
13	11	13	12.0	250.0	65.0	0.522384	KNOWN	0.155	0.100
11	12	18	24.0	680.0	65.0	0.048589	KNOWN	1.850	1.194
12	16	13	12.0	230.0	65.0	0.480593	KNOWN	0.150	0.097
9	13	17	12.0	780.0	65.0	1.629837	KNOWN	0.282	0.182
17	14	16	12.0	490.0	65.0	1.023872	KNOWN	0.407	0.263
31	15	21	8.0	1000.0	65.0	15.052683	KNOWN	0.364	0.235
26	31	15	6.0	360.0	65.0	21.997232	KNOWN	0.322	0.207
10	16	17	12.0	1200.0	65.0	2.507441	KNOWN	0.234	0.151
8	17	18	12.0	280.0	65.0	0.585070	KNOWN	0.042	0.027
53	17	33	12.0	290.0	65.0	0.605965	KNOWN	0.450	0.291
6	18	19	12.0	250.0	65.0	0.522384	KNOWN	1.428	0.921
7	33	19	8.0	280.0	65.0	4.214751	KNOWN	0.427	0.276
59	19	38	12.0	320.0	65.0	0.668651	KNOWN	1.846	1.191
33	20	22	12.0	250.0	65.0	0.522384	KNOWN	0.432	0.279
32	20	29	8.0	1230.0	65.0	18.514800	KNOWN	0.231	0.149
34	21	22	8.0	230.0	65.0	3.462117	KNOWN	0.196	0.126
51	21	34	8.0	950.0	65.0	14.300049	KNOWN	0.145	0.094
50	22	23	12.0	1000.0	65.0	2.089534	KNOWN	0.311	0.201
35	22	35	8.0	620.0	65.0	9.332664	KNOWN	0.293	0.189
52	23	24	12.0	1500.0	65.0	3.134301	KNOWN	0.410	0.265
24	34	23	12.0	200.0	65.0	0.417907	KNOWN	0.122	0.079
45	26	24	6.0	310.0	65.0	18.942061	KNOWN	0.064	0.041
46	24	30	12.0	1300.0	65.0	2.716395	KNOWN	0.428	0.276
44	25	26	8.0	150.0	65.0	2.257902	KNOWN	0.466	0.301
41	25	27	8.0	450.0	65.0	6.773707	KNOWN	0.303	0.196
43	26	28	10.0	430.0	65.0	2.183387	KNOWN	0.355	0.229
40	27	28	8.0	210.0	65.0	3.161063	KNOWN	0.176	0.114
37	27	35	8.0	200.0	65.0	3.010537	KNOWN	0.104	0.067
39	28	29	12.0	220.0	65.0	0.459698	KNOWN	0.362	0.234
47	28	30	8.0	840.0	65.0	12.644254	KNOWN	0.146	0.094
36	35	29	12.0	450.0	65.0	0.940290	KNOWN	0.374	0.241

PH-6

Fire Demand at Node 20

NODE	CONNECTING PIPE NUMBS				ELEV FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT OF H2O	STATUS HEAD	PRES HEAD FT OF H2O
1	1	42	0	0	40.0	2.440	1.574	UNKWN	233.300	KNOWN	193.300
2	1	2	56	0	210.0	-0.047	-0.030	KNOWN	232.195	UNKWN	22.195
3	3	49	48	5	185.0	-0.047	-0.030	KNOWN	231.315	UNKWN	46.315
4	2	3	38	0	200.0	-0.930	-0.600	KNOWN	231.320	UNKWN	31.320
5	29	30	4	0	120.0	-0.023	-0.015	KNOWN	231.323	UNKWN	111.323
6	29	28	27	0	100.0	-0.023	-0.015	KNOWN	231.890	UNKWN	131.890
7	28	22	18	0	80.0	-0.186	-0.120	KNOWN	232.906	UNKWN	152.906
8	22	21	23	0	70.9	2.647	1.708	UNKWN	233.000	KNOWN	162.100
9	21	19	20	0	70.9	0.506	0.326	UNKWN	233.000	KNOWN	162.100
10	19	15	16	0	130.0	-0.023	-0.015	KNOWN	232.899	UNKWN	102.899
11	15	14	13	0	130.0	-0.023	-0.015	KNOWN	232.839	UNKWN	102.839
12	18	14	11	0	180.0	-0.023	-0.015	KNOWN	232.832	UNKWN	52.832
13	13	12	9	0	120.0	-0.023	-0.015	KNOWN	232.833	UNKWN	112.833
14	20	16	17	0	63.0	-0.023	-0.015	KNOWN	232.908	UNKWN	169.908
15	27	31	26	0	60.0	-0.023	-0.015	KNOWN	231.263	UNKWN	171.263
16	12	17	10	0	63.0	-0.023	-0.015	KNOWN	232.838	UNKWN	169.838
17	9	10	8	53	120.0	-0.023	-0.015	KNOWN	232.785	UNKWN	112.785
18	11	8	6	0	200.0	-0.465	-0.300	KNOWN	232.783	UNKWN	32.783
19	6	7	59	0	200.0	-0.009	-0.006	KNOWN	232.583	UNKWN	32.583
20	30	33	32	0	120.0	-3.342	-2.156	KNOWN	227.469	UNKWN	107.469
21	31	34	51	0	110.0	-0.023	-0.015	KNOWN	229.037	UNKWN	119.037
22	33	34	50	35	110.0	-0.023	-0.015	KNOWN	228.445	UNKWN	118.445
23	50	52	24	0	60.0	-0.023	-0.015	KNOWN	229.101	UNKWN	169.101
24	52	45	46	0	40.0	-0.047	-0.030	KNOWN	230.450	UNKWN	190.450
25	42	44	41	0	80.0	-0.023	-0.015	KNOWN	231.393	UNKWN	151.393
26	45	44	43	0	80.0	-0.047	-0.030	KNOWN	231.208	UNKWN	151.208
27	41	40	37	0	120.0	-0.023	-0.015	KNOWN	231.191	UNKWN	111.191
28	43	40	39	47	120.0	-0.023	-0.015	KNOWN	231.204	UNKWN	111.204
29	49	38	32	39	140.0	-0.009	-0.006	KNOWN	231.204	UNKWN	91.204
30	48	46	47	0	70.0	0.046	0.030	KNOWN	231.215	UNKWN	161.215
31	26	25	0	0	40.0	-0.023	-0.015	KNOWN	232.863	UNKWN	192.863
32	23	25	0	0	40.0	-0.023	-0.015	KNOWN	232.921	UNKWN	192.921
33	53	7	0	0	120.0	-0.023	-0.015	KNOWN	232.754	UNKWN	112.754
34	51	24	0	0	60.0	-0.023	-0.015	KNOWN	229.098	UNKWN	169.098
35	35	37	36	0	130.0	-0.023	-0.015	KNOWN	231.069	UNKWN	101.069
36	5	57	0	0	185.0	0.000	0.000	KNOWN	231.543	UNKWN	46.543
37	57	58	0	0	180.0	0.000	0.000	KNOWN	231.797	UNKWN	51.797
38	59	58	0	0	175.0	0.000	0.000	KNOWN	232.177	UNKWN	57.177
39	4	54	0	0	180.0	0.000	0.000	KNOWN	231.774	UNKWN	51.774
40	56	55	0	0	212.0	-0.023	-0.015	KNOWN	232.049	UNKWN	20.049
41	54	55	0	0	212.0	0.000	0.000	KNOWN	231.916	UNKWN	19.916

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	DISCHARGE CFS	DISCHARGE MGD
1	1	2	20.0	1750.0	65.0	0.303868	KNOWN	2.008	1.296
42	1	25	8.0	600.0	65.0	9.031610	KNOWN	0.432	0.279
2	2	4	12.0	200.0	65.0	0.417907	KNOWN	1.490	0.961
56	2	40	12.0	280.0	65.0	0.585070	KNOWN	0.472	0.305
3	4	3	12.0	380.0	65.0	0.794023	KNOWN	0.067	0.043
49	3	29	12.0	480.0	65.0	1.002976	KNOWN	0.305	0.197
48	3	30	16.0	750.0	65.0	0.386064	KNOWN	0.482	0.311
5	36	3	12.0	180.0	65.0	0.376116	KNOWN	0.764	0.493
38	4	29	12.0	210.0	65.0	0.438802	KNOWN	0.489	0.315
29	6	5	12.0	230.0	65.0	0.480593	KNOWN	1.094	0.706
30	5	20	12.0	850.0	65.0	1.776104	KNOWN	1.519	0.980
4	39	5	12.0	950.0	65.0	1.985058	KNOWN	0.449	0.290
28	7	6	12.0	320.0	65.0	0.668651	KNOWN	1.253	0.809
27	6	15	6.0	410.0	65.0	25.052403	KNOWN	0.137	0.088
22	8	7	24.0	270.0	65.0	0.019293	KNOWN	2.357	1.521
18	7	12	24.0	1200.0	65.0	0.085746	KNOWN	0.918	0.592
21	8	9	12.0	130.0	65.0	0.271639	KNOWN	0.000	0.000
23	8	32	16.0	1530.0	65.0	0.787570	KNOWN	0.289	0.187
19	9	10	12.0	700.0	65.0	1.462674	KNOWN	0.236	0.152
20	9	14	12.0	500.0	65.0	1.044767	KNOWN	0.270	0.174
15	10	11	12.0	450.0	65.0	0.940290	KNOWN	0.226	0.146
16	14	10	6.0	380.0	65.0	23.219300	KNOWN	0.014	0.009
14	11	12	12.0	180.0	65.0	0.376116	KNOWN	0.115	0.074
13	11	13	12.0	250.0	65.0	0.522384	KNOWN	0.088	0.057
11	12	18	24.0	680.0	65.0	0.048589	KNOWN	1.010	0.652
12	16	13	12.0	230.0	65.0	0.480593	KNOWN	0.085	0.055
9	13	17	12.0	780.0	65.0	1.629837	KNOWN	0.149	0.096
17	14	16	12.0	490.0	65.0	1.023872	KNOWN	0.233	0.150
31	15	21	8.0	1000.0	65.0	15.052683	KNOWN	0.356	0.230
26	31	15	6.0	360.0	65.0	21.997232	KNOWN	0.243	0.157
10	16	17	12.0	1200.0	65.0	2.507441	KNOWN	0.125	0.081
8	17	18	12.0	280.0	65.0	0.585070	KNOWN	0.050	0.033
53	17	33	12.0	290.0	65.0	0.605965	KNOWN	0.201	0.129
6	18	19	12.0	250.0	65.0	0.522384	KNOWN	0.595	0.384
7	33	19	8.0	280.0	65.0	4.214751	KNOWN	0.177	0.114
59	19	38	12.0	320.0	65.0	0.668651	KNOWN	0.764	0.493
33	22	20	12.0	250.0	65.0	0.522384	KNOWN	1.401	0.904
32	29	20	8.0	1230.0	65.0	18.514800	KNOWN	0.421	0.272
34	21	22	8.0	230.0	65.0	3.462117	KNOWN	0.385	0.249
51	34	21	8.0	950.0	65.0	14.300049	KNOWN	0.052	0.034
50	23	22	12.0	1000.0	65.0	2.089534	KNOWN	0.535	0.345
35	35	22	8.0	620.0	65.0	9.332664	KNOWN	0.504	0.325
52	24	23	12.0	1500.0	65.0	3.134301	KNOWN	0.634	0.409
24	23	34	12.0	200.0	65.0	0.417907	KNOWN	0.076	0.049
45	26	24	6.0	310.0	65.0	18.942061	KNOWN	0.176	0.114
46	30	24	12.0	1300.0	65.0	2.716395	KNOWN	0.505	0.326
44	25	26	8.0	150.0	65.0	2.257902	KNOWN	0.259	0.167
41	25	27	8.0	450.0	65.0	6.773707	KNOWN	0.150	0.097
43	26	28	10.0	430.0	65.0	2.183387	KNOWN	0.037	0.024
40	28	27	8.0	210.0	65.0	3.161063	KNOWN	0.051	0.033
37	27	35	8.0	200.0	65.0	3.010537	KNOWN	0.177	0.114
39	29	28	12.0	220.0	65.0	0.459698	KNOWN	0.021	0.013
47	30	28	8.0	840.0	65.0	12.644254	KNOWN	0.023	0.015
36	29	35	12.0	450.0	65.0	0.940290	KNOWN	0.351	0.226
25	32	31	12.0	320.0	65.0	0.668651	KNOWN	0.266	0.172
57	37	36	12.0	200.0	65.0	0.417907	KNOWN	0.764	0.493
58	38	37	12.0	300.0	65.0	0.626860	KNOWN	0.763	0.492
54	41	39	12.0	300.0	65.0	0.626860	KNOWN	0.449	0.290
55	40	41	12.0	280.0	65.0	0.585070	KNOWN	0.449	0.290

PH-7

Maximum Normal Demand

NODE	CONNECTING PIPE NUMBS				ELEV FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT OF H2O	STATUS HEAD	PRES HEAD FT OF H2O
1	1	42	0	0	40.0	2.643	1.705	UNKWN	233.300	KNOWN	193.300
2	1	2	56	0	210.0	-0.047	-0.030	KNOWN	232.068	UNKWN	22.068
3	3	49	48	5	185.0	-0.047	-0.030	KNOWN	230.032	UNKWN	45.032
4	2	3	38	0	200.0	-0.930	-0.600	KNOWN	230.466	UNKWN	30.466
5	29	30	4	0	120.0	-0.023	-0.015	KNOWN	232.068	UNKWN	112.068
6	29	28	27	0	100.0	-0.023	-0.015	KNOWN	232.369	UNKWN	132.369
7	28	22	18	0	80.0	-0.186	-0.120	KNOWN	232.914	UNKWN	152.914
8	22	21	23	0	70.9	2.466	1.591	UNKWN	233.000	KNOWN	162.100
9	21	19	20	0	70.9	0.559	0.360	UNKWN	233.000	KNOWN	162.100
10	19	15	16	0	130.0	-0.023	-0.015	KNOWN	232.880	UNKWN	102.880
11	15	14	13	0	130.0	-0.023	-0.015	KNOWN	232.807	UNKWN	102.807
12	18	14	11	0	180.0	-0.023	-0.015	KNOWN	232.801	UNKWN	52.801
13	13	12	9	0	120.0	-0.023	-0.015	KNOWN	232.797	UNKWN	112.797
14	20	16	17	0	63.0	-0.023	-0.015	KNOWN	232.888	UNKWN	169.888
15	27	31	26	0	60.0	-0.023	-0.015	KNOWN	232.038	UNKWN	172.038
16	12	17	10	0	63.0	-0.023	-0.015	KNOWN	232.803	UNKWN	169.803
17	9	10	8	53	120.0	-0.023	-0.015	KNOWN	232.728	UNKWN	112.728
18	11	8	6	0	200.0	-0.465	-0.300	KNOWN	232.727	UNKWN	32.727
19	6	7	59	0	200.0	-0.009	-0.006	KNOWN	232.362	UNKWN	32.362
20	30	33	32	0	120.0	-0.023	-0.015	KNOWN	231.037	UNKWN	111.037
21	31	34	51	0	110.0	-0.023	-0.015	KNOWN	230.888	UNKWN	120.888
22	33	34	50	35	110.0	-0.023	-0.015	KNOWN	230.860	UNKWN	120.860
23	50	52	24	0	60.0	-0.023	-0.015	KNOWN	230.446	UNKWN	170.446
24	52	45	46	0	40.0	-0.047	-0.030	KNOWN	229.506	UNKWN	189.506
25	42	44	41	0	80.0	-0.023	-0.015	KNOWN	230.665	UNKWN	150.665
26	45	44	43	0	80.0	-0.047	-0.030	KNOWN	230.382	UNKWN	150.382
27	41	40	37	0	120.0	-0.023	-0.015	KNOWN	230.424	UNKWN	110.424
28	43	40	39	47	120.0	-0.023	-0.015	KNOWN	230.358	UNKWN	110.358
29	49	38	32	39	140.0	-0.009	-0.006	KNOWN	230.380	UNKWN	90.380
30	48	46	47	0	70.0	-3.348	-2.160	KNOWN	228.227	UNKWN	158.227
31	26	25	0	0	40.0	-0.023	-0.015	KNOWN	232.918	UNKWN	192.918
32	23	25	0	0	40.0	-0.023	-0.015	KNOWN	232.951	UNKWN	192.951
33	53	7	0	0	120.0	-0.023	-0.015	KNOWN	232.675	UNKWN	112.675
34	51	24	0	0	60.0	-0.023	-0.015	KNOWN	230.455	UNKWN	170.455
35	35	37	36	0	130.0	-0.023	-0.015	KNOWN	230.422	UNKWN	100.422
36	5	57	0	0	185.0	0.000	0.000	KNOWN	230.451	UNKWN	45.451
37	57	58	0	0	180.0	0.000	0.000	KNOWN	230.917	UNKWN	50.917
38	59	58	0	0	175.0	0.000	0.000	KNOWN	231.616	UNKWN	56.616
39	4	54	0	0	180.0	0.000	0.000	KNOWN	232.068	UNKWN	52.068
40	56	55	0	0	212.0	-0.023	-0.015	KNOWN	232.068	UNKWN	20.068
41	54	55	0	0	212.0	0.000	0.000	KNOWN	232.068	UNKWN	20.068

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	- DISCHARGE - CFS	MGD
1	1	2	20.0	1750.0	65.0	0.303868	KNOWN	2.129	1.374
42	1	25	8.0	600.0	65.0	9.031610	KNOWN	0.514	0.332
2	2	4	12.0	200.0	65.0	0.417907	KNOWN	2.066	1.333
56	2	40	12.0	280.0	65.0	0.585070	KNOWN	0.018	0.011
3	4	3	12.0	380.0	65.0	0.794023	KNOWN	0.721	0.465
49	29	3	12.0	480.0	65.0	1.002976	KNOWN	0.564	0.364
48	3	30	16.0	750.0	65.0	0.386064	KNOWN	2.300	1.484
5	36	3	12.0	180.0	65.0	0.376116	KNOWN	1.061	0.684
38	4	29	12.0	210.0	65.0	0.438802	KNOWN	0.415	0.268
29	6	5	12.0	230.0	65.0	0.480593	KNOWN	0.776	0.500
30	5	20	12.0	850.0	65.0	1.776104	KNOWN	0.746	0.481
4	5	39	12.0	950.0	65.0	1.985058	KNOWN	0.009	0.006
28	7	6	12.0	320.0	65.0	0.668651	KNOWN	0.896	0.578
27	6	15	6.0	410.0	65.0	25.052403	KNOWN	0.097	0.062
22	8	7	24.0	270.0	65.0	0.019293	KNOWN	2.244	1.448
18	7	12	24.0	1200.0	65.0	0.085746	KNOWN	1.162	0.750
21	8	9	12.0	130.0	65.0	0.271639	KNOWN	0.000	0.000
23	8	32	16.0	1530.0	65.0	0.787570	KNOWN	0.222	0.143
19	9	10	12.0	700.0	65.0	1.462674	KNOWN	0.260	0.168
20	9	14	12.0	500.0	65.0	1.044767	KNOWN	0.299	0.193
15	10	11	12.0	450.0	65.0	0.940290	KNOWN	0.251	0.162
16	14	10	6.0	380.0	65.0	23.219300	KNOWN	0.014	0.009
14	11	12	12.0	180.0	65.0	0.376116	KNOWN	0.112	0.072
13	11	13	12.0	250.0	65.0	0.522384	KNOWN	0.116	0.075
11	12	18	24.0	680.0	65.0	0.048589	KNOWN	1.251	0.807
12	16	13	12.0	230.0	65.0	0.480593	KNOWN	0.089	0.057
9	13	17	12.0	780.0	65.0	1.629837	KNOWN	0.181	0.117
17	14	16	12.0	490.0	65.0	1.023872	KNOWN	0.262	0.169
31	15	21	8.0	1000.0	65.0	15.072683	KNOWN	0.249	0.161
26	31	15	6.0	360.0	65.0	21.997232	KNOWN	0.170	0.110
10	16	17	12.0	1200.0	65.0	2.507441	KNOWN	0.150	0.097
8	17	18	12.0	280.0	65.0	0.585070	KNOWN	0.038	0.025
53	17	33	12.0	290.0	65.0	0.605965	KNOWN	0.269	0.174
6	18	19	12.0	250.0	65.0	0.522384	KNOWN	0.824	0.532
7	33	19	8.0	280.0	65.0	4.214751	KNOWN	0.246	0.159
59	19	38	12.0	320.0	65.0	0.668651	KNOWN	1.061	0.684
33	20	22	12.0	250.0	65.0	0.522384	KNOWN	0.557	0.360
32	20	29	8.0	1230.0	65.0	18.514800	KNOWN	0.165	0.106
34	21	22	8.0	230.0	65.0	3.462117	KNOWN	0.075	0.048
51	21	34	8.0	950.0	65.0	14.300849	KNOWN	0.151	0.098
50	22	23	12.0	1000.0	65.0	2.089534	KNOWN	0.417	0.269
35	22	35	8.0	620.0	65.0	9.332664	KNOWN	0.192	0.124
52	23	24	12.0	1500.0	65.0	3.134301	KNOWN	0.522	0.337
24	34	23	12.0	200.0	65.0	0.417907	KNOWN	0.128	0.083
45	26	24	6.0	310.0	65.0	18.942061	KNOWN	0.190	0.123
46	24	30	12.0	1300.0	65.0	2.716395	KNOWN	0.666	0.430
44	25	26	8.0	150.0	65.0	2.257902	KNOWN	0.326	0.210
41	25	27	8.0	450.0	65.0	6.773707	KNOWN	0.165	0.107
43	26	28	10.0	430.0	65.0	2.183387	KNOWN	0.089	0.057
40	27	28	8.0	210.0	65.0	3.161063	KNOWN	0.124	0.080
37	27	35	8.0	200.0	65.0	3.010537	KNOWN	0.018	0.012
39	29	28	12.0	220.0	65.0	0.459698	KNOWN	0.193	0.125
47	28	30	8.0	840.0	65.0	12.644254	KNOWN	0.382	0.247
36	35	29	12.0	450.0	65.0	0.940290	KNOWN	0.187	0.121
25	32	31	12.0	320.0	65.0	0.668651	KNOWN	0.199	0.128
57	37	36	12.0	200.0	65.0	0.417907	KNOWN	1.061	0.684
58	38	37	12.0	300.0	65.0	0.626860	KNOWN	1.061	0.684
54	39	41	12.0	300.0	65.0	0.626860	KNOWN	0.009	0.006
55	41	40	12.0	280.0	65.0	0.585070	KNOWN	0.002	0.001

PH-8

Maximum Normal Demand, Total Head = 240.5

	PIPE NUMBS				FT	CFS	MGD	CONS	FT OF H2O	HEAD	FT OF H2O
1	1	42	0	0	40.0	2.196	1.417	UNKWN	240.500	KNOWN	200.500
2	1	2	4	0	210.0	-0.930	-0.600	KNOWN	239.543	UNKWN	29.543
3	3	5	49	48	185.0	-0.465	-0.300	KNOWN	239.116	UNKWN	54.116
4	2	3	38	0	200.0	-4.441	-0.930	KNOWN	239.093	UNKWN	39.093
5	4	29	30	0	120.0	-0.023	-0.015	KNOWN	239.608	UNKWN	119.608
6	29	28	27	0	100.0	-0.023	-0.015	KNOWN	239.734	UNKWN	139.734
7	28	22	18	0	80.0	-0.186	-0.120	KNOWN	239.958	UNKWN	159.958
8	22	21	23	0	70.9	1.670	1.078	UNKWN	240.000	KNOWN	169.100
9	21	19	20	0	70.9	0.386	0.249	UNKWN	240.000	KNOWN	169.100
10	19	15	16	0	130.0	-0.023	-0.015	KNOWN	239.939	UNKWN	109.939
11	15	14	13	0	130.0	-0.023	-0.015	KNOWN	239.906	UNKWN	109.906
12	18	14	11	0	180.0	-0.023	-0.015	KNOWN	239.903	UNKWN	59.903
13	13	12	9	0	120.0	-0.023	-0.015	KNOWN	239.901	UNKWN	119.901
14	20	16	17	0	63.0	-0.023	-0.015	KNOWN	239.943	UNKWN	176.943
15	27	31	26	0	60.0	-0.023	-0.015	KNOWN	239.648	UNKWN	179.648
16	12	17	10	0	63.0	-0.023	-0.015	KNOWN	239.903	UNKWN	176.903
17	9	10	8	53	120.0	-0.023	-0.015	KNOWN	239.871	UNKWN	119.871
18	11	8	6	0	200.0	-0.465	-0.300	KNOWN	239.870	UNKWN	39.870
19	5	6	7	0	200.0	-0.009	-0.006	KNOWN	239.774	UNKWN	39.774
20	30	33	32	0	120.0	-0.023	-0.015	KNOWN	239.355	UNKWN	119.355
21	31	34	51	0	110.0	-0.023	-0.015	KNOWN	239.331	UNKWN	129.331
22	33	34	50	35	110.0	-0.023	-0.015	KNOWN	239.320	UNKWN	129.320
23	50	52	24	0	60.0	-0.023	-0.015	KNOWN	239.264	UNKWN	179.264
24	52	45	46	0	40.0	-0.047	-0.030	KNOWN	239.173	UNKWN	199.173
25	42	44	41	0	80.0	-0.023	-0.015	KNOWN	239.293	UNKWN	159.293
26	45	44	43	0	80.0	-0.047	-0.030	KNOWN	239.186	UNKWN	159.186
27	41	40	37	0	120.0	-0.023	-0.015	KNOWN	239.156	UNKWN	119.156
28	43	40	39	47	120.0	-0.023	-0.015	KNOWN	239.138	UNKWN	119.138
29	49	38	32	39	140.0	-0.009	-0.006	KNOWN	239.128	UNKWN	99.128
30	48	46	47	0	70.0	-0.139	-0.090	KNOWN	239.116	UNKWN	169.116
31	26	25	0	0	40.0	-0.023	-0.015	KNOWN	239.963	UNKWN	199.963
32	23	25	0	0	40.0	-0.023	-0.015	KNOWN	239.977	UNKWN	199.977
33	53	7	0	0	120.0	-0.023	-0.015	KNOWN	239.855	UNKWN	119.855
34	51	24	0	0	60.0	-0.023	-0.015	KNOWN	239.265	UNKWN	179.265
35	35	37	36	0	130.0	-0.023	-0.015	KNOWN	239.148	UNKWN	109.148

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	- DISCHARGE - CFS	MGD
1	1	2	20.0	1750.0	65.0	0.303868	KNOWN	1.858	1.199
42	1	25	8.0	600.0	65.0	9.031610	KNOWN	0.337	0.218
2	2	4	12.0	200.0	65.0	0.417907	KNOWN	1.040	0.671
4	5	2	12.0	1820.0	65.0	3.602952	KNOWN	0.112	0.072
3	3	4	12.0	380.0	65.0	0.794023	KNOWN	0.148	0.096
5	19	3	12.0	1100.0	65.0	2.298488	KNOWN	0.509	0.328
49	29	3	12.0	480.0	65.0	1.002976	KNOWN	0.089	0.057
48	30	3	16.0	750.0	65.0	0.386064	KNOWN	0.017	0.011
38	29	4	12.0	210.0	65.0	0.438802	KNOWN	0.253	0.163
29	6	5	12.0	230.0	65.0	0.480593	KNOWN	0.484	0.312
30	5	20	12.0	850.0	65.0	1.776104	KNOWN	0.349	0.225
28	7	6	12.0	320.0	65.0	0.668651	KNOWN	0.554	0.358
27	6	15	6.0	410.0	65.0	25.052403	KNOWN	0.047	0.030
22	8	7	24.0	270.0	65.0	0.019293	KNOWN	1.522	0.982
18	7	12	24.0	1200.0	65.0	0.085746	KNOWN	0.783	0.505
21	8	9	12.0	130.0	65.0	0.271639	KNOWN	0.000	0.000
23	8	32	16.0	1530.0	65.0	0.787570	KNOWN	0.147	0.095
19	9	10	12.0	700.0	65.0	1.462674	KNOWN	0.179	0.116
20	9	14	12.0	500.0	65.0	1.044767	KNOWN	0.207	0.134
15	10	11	12.0	450.0	65.0	0.940290	KNOWN	0.166	0.107
16	14	10	6.0	380.0	65.0	23.219300	KNOWN	0.009	0.006
14	11	12	12.0	180.0	65.0	0.376116	KNOWN	0.062	0.040
13	11	13	12.0	250.0	65.0	0.522384	KNOWN	0.080	0.052
11	12	18	24.0	680.0	65.0	0.048589	KNOWN	0.821	0.530
12	16	13	12.0	230.0	65.0	0.480593	KNOWN	0.057	0.037
9	13	17	12.0	780.0	65.0	1.629837	KNOWN	0.114	0.074
17	14	16	12.0	490.0	65.0	1.023872	KNOWN	0.174	0.113
31	15	21	8.0	1000.0	65.0	15.072683	KNOWN	0.124	0.080
26	31	15	6.0	360.0	65.0	21.997232	KNOWN	0.101	0.065
10	16	17	12.0	1200.0	65.0	2.507441	KNOWN	0.094	0.061
8	17	18	12.0	280.0	65.0	0.585070	KNOWN	0.043	0.028
53	17	33	12.0	290.0	65.0	0.605965	KNOWN	0.142	0.091
6	18	19	12.0	250.0	65.0	0.522384	KNOWN	0.400	0.258
7	33	19	8.0	280.0	65.0	4.214751	KNOWN	0.118	0.076
33	20	22	12.0	250.0	65.0	0.522384	KNOWN	0.233	0.150
32	20	29	8.0	1230.0	65.0	18.514800	KNOWN	0.093	0.060
34	21	22	8.0	230.0	65.0	3.462117	KNOWN	0.046	0.030
51	21	34	8.0	950.0	65.0	14.300049	KNOWN	0.055	0.035
50	22	23	12.0	1000.0	65.0	2.089534	KNOWN	0.141	0.091
35	22	35	8.0	620.0	65.0	9.332664	KNOWN	0.116	0.075
52	23	24	12.0	1500.0	65.0	3.134301	KNOWN	0.148	0.096
24	34	23	12.0	200.0	65.0	0.417907	KNOWN	0.032	0.020
45	26	24	6.0	310.0	65.0	18.942061	KNOWN	0.020	0.013
46	24	30	12.0	1300.0	65.0	2.716395	KNOWN	0.123	0.080
44	25	26	8.0	150.0	65.0	2.257902	KNOWN	0.193	0.124
41	25	27	8.0	450.0	65.0	6.773707	KNOWN	0.121	0.078
43	26	28	10.0	430.0	65.0	2.183387	KNOWN	0.127	0.082
28	28	31	12.0						.080
47	28	30	8.0						.081
36	35	29	12.0						.080
37	37	28	8.0						.009
39	29	28	12.0						.082
40	27	28	20.0						.040

PH-9

Hydrant Discharge = 2,250 gpm

NODE	CONNECTING PIPE NUMBS				ELEV FT	CONSUMPTION CFS	MGD	STATUS CONS	TOT HEAD FT OF H20	STATUS HEAD	PRES HEAD FT OF H20
1	1	42	0	0	40·0	4·253	2·744	UNKWN	240·500	KNOWN	200·500
2	1	2	56	0	210·0	-1·674	-1·080	KNOWN	237·113	UNKWN	27·113
3	3	49	48	5	185·0	-2·139	-1·380	KNOWN	236·576	UNKWN	51·576
4	2	3	38	0	200·0	-0·930	-0·600	KNOWN	236·697	UNKWN	36·697
5	29	30	4	0	120·0	-0·023	-0·015	KNOWN	238·035	UNKWN	118·035
6	29	28	27	0	100·0	-0·023	-0·015	KNOWN	238·752	UNKWN	138·752
7	28	22	18	0	80·0	-0·186	-0·120	KNOWN	239·879	UNKWN	159·879
8	22	21	23	0	70·9	2·965	1·913	UNKWN	240·000	KNOWN	169·100
9	21	19	20	0	70·9	0·612	0·395	UNKWN	240·000	KNOWN	169·100
10	19	15	16	0	130·0	-0·023	-0·015	KNOWN	239·857	UNKWN	109·857
11	15	14	13	0	130·0	-0·023	-0·015	KNOWN	239·768	UNKWN	109·768
12	18	14	11	0	180·0	-0·023	-0·015	KNOWN	239·760	UNKWN	59·760
13	13	12	9	0	120·0	-0·023	-0·015	KNOWN	239·759	UNKWN	119·759
14	20	16	17	0	63·0	-0·023	-0·015	KNOWN	239·868	UNKWN	176·868
15	27	31	26	0	60·0	-0·023	-0·015	KNOWN	238·614	UNKWN	178·614
16	12	17	10	0	63·0	-0·023	-0·015	KNOWN	239·766	UNKWN	176·766
17	9	10	8	53	120·0	-0·023	-0·015	KNOWN	239·681	UNKWN	119·681
18	11	8	6	0	200·0	-0·465	-0·300	KNOWN	239·679	UNKWN	39·679
19	6	7	59	0	200·0	-0·009	-0·006	KNOWN	239·260	UNKWN	39·260
20	30	33	32	0	120·0	-0·023	-0·015	KNOWN	237·448	UNKWN	117·448
21	31	34	51	0	110·0	-0·023	-0·015	KNOWN	237·443	UNKWN	127·443
22	33	34	50	35	110·0	-0·023	-0·015	KNOWN	237·371	UNKWN	127·371
23	50	52	24	0	60·0	-0·023	-0·015	KNOWN	237·221	UNKWN	177·221
24	52	45	46	0	40·0	-0·047	-0·030	KNOWN	236·888	UNKWN	196·888
25	42	44	41	0	80·0	-0·023	-0·015	KNOWN	237·243	UNKWN	157·243
26	45	44	43	0	80·0	-0·047	-0·030	KNOWN	236·943	UNKWN	156·943
27	41	40	37	0	120·0	-0·023	-0·015	KNOWN	236·844	UNKWN	116·844
28	43	40	39	47	120·0	-0·023	-0·015	KNOWN	236·778	UNKWN	116·778
29	49	38	32	39	140·0	-0·009	-0·006	KNOWN	236·743	UNKWN	96·743
30	48	46	47	0	70·0	-0·139	-0·090	KNOWN	236·606	UNKWN	166·606
31	26	25	0	0	40·0	-0·023	-0·015	KNOWN	239·888	UNKWN	199·888
32	23	25	0	0	40·0	-0·023	-0·015	KNOWN	239·934	UNKWN	199·934
33	53	7	0	0	120·0	-0·023	-0·015	KNOWN	239·621	UNKWN	119·621
34	51	24	0	0	60·0	-0·023	-0·015	KNOWN	237·225	UNKWN	177·225
35	35	37	36	0	130·0	-0·023	-0·015	KNOWN	236·822	UNKWN	106·822
36	5	57	0	0	185·0	0·000	0·000	KNOWN	237·059	UNKWN	52·059
37	57	58	0	0	180·0	0·000	0·000	KNOWN	237·596	UNKWN	57·596
38	59	58	0	0	175·0	0·000	0·000	KNOWN	238·401	UNKWN	63·401
39	4	54	0	0	180·0	0·000	0·000	KNOWN	237·095	UNKWN	57·095
40	56	55	0	0	212·0	-1·674	-1·080	KNOWN	236·521	UNKWN	24·521
41	54	55	0	0	212·0	0·000	0·000	KNOWN	236·798	UNKWN	24·798

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	- DISCHARGE - CFS	MGD
1	1	2	20·0	1750·0	65·0	0·303868	KNOWN	3·677	2·372
42	1	25	8·0	600·0	65·0	9·031610	KNOWN	0·576	0·372
2	2	4	12·0	200·0	65·0	0·417907	KNOWN	0·997	0·643
56	2	40	12·0	280·0	65·0	0·585070	KNOWN	1·006	0·649
3	4	3	12·0	380·0	65·0	0·794023	KNOWN	0·362	0·234
49	29	3	12·0	460·0	65·0	1·002976	KNOWN	0·380	0·245
48	30	3	16·0	750·0	65·0	0·386064	KNOWN	0·253	0·163
5	36	3	12·0	180·0	65·0	0·376116	KNOWN	1·145	0·739
38	29	4	12·0	210·0	65·0	0·438802	KNOWN	0·295	0·190
29	6	5	12·0	230·0	65·0	0·480593	KNOWN	1·241	0·801
30	5	20	12·0	850·0	65·0	1·776104	KNOWN	0·550	0·355
4	5	39	12·0	950·0	65·0	1·985058	KNOWN	0·668	0·431
28	7	6	12·0	320·0	65·0	0·668651	KNOWN	1·325	0·855
27	6	15	6·0	410·0	65·0	25·052403	KNOWN	0·060	0·039
22	8	7	24·0	270·0	65·0	0·019293	KNOWN	2·700	1·742
18	7	12	24·0	1200·0	65·0	0·085746	KNOWN	1·194	0·770
21	8	9	12·0	130·0	65·0	0·271639	KNOWN	0·000	0·000
23	8	32	16·0	1530·0	65·0	0·787570	KNOWN	0·261	0·169
19	9	10	12·0	700·0	65·0	1·462674	KNOWN	0·285	0·184
20	9	14	12·0	500·0	65·0	1·044767	KNOWN	0·327	0·211
15	10	11	12·0	450·0	65·0	0·940290	KNOWN	0·279	0·180
16	14	10	6·0	360·0	65·0	23·219300	KNOWN	0·016	0·011
14	11	12	12·0	180·0	65·0	0·376116	KNOWN	0·133	0·086
13	11	13	12·0	250·0	65·0	0·522384	KNOWN	0·114	0·073
11	12	18	24·0	680·0	65·0	0·048589	KNOWN	1·310	0·845
12	16	13	12·0	230·0	65·0	0·480593	KNOWN	0·103	0·067
9	13	17	12·0	780·0	65·0	1·629837	KNOWN	0·193	0·125
17	14	16	12·0	490·0	65·0	1·023872	KNOWN	0·287	0·185
31	15	21	8·0	1000·0	65·0	15·052683	KNOWN	0·252	0·162
26	31	15	6·0	360·0	65·0	21·997232	KNOWN	0·215	0·139
10	16	17	12·0	1200·0	65·0	2·507441	KNOWN	0·161	0·104
8	17	18	12·0	280·0	65·0	0·585070	KNOWN	0·046	0·030
53	17	33	12·0	290·0	65·0	0·605965	KNOWN	0·289	0·186
6	18	19	12·0	250·0	65·0	0·522384	KNOWN	0·889	0·573
7	33	19	8·0	280·0	65·0	4·214751	KNOWN	0·265	0·171
59	19	38	12·0	320·0	65·0	0·668651	KNOWN	1·145	0·736
33	20	22	12·0	250·0	65·0	0·522384	KNOWN	0·356	0·230
32	20	29	8·0	1230·0	65·0	18·514800	KNOWN	0·171	0·110
34	21	22	8·0	230·0	65·0	3·462117	KNOWN	0·124	0·080
51	21	34	8·0	950·0	65·0	14·300049	KNOWN	0·104	0·067
50	22	23	12·0	1000·0	65·0	2·089534	KNOWN	0·240	0·155
35	22	35	8·0	620·0	65·0	9·332664	KNOWN	0·216	0·140
52	23	24	12·0	1500·0	65·0	3·134301	KNOWN	0·298	0·192
24	34	23	12·0	200·0	65·0	0·417907	KNOWN	0·081	0·052
45	26	24	6·0	310·0	65·0	18·942061	KNOWN	0·042	0·027
46	24	30	12·0	1300·0	65·0	2·716395	KNOWN	0·294	0·190
44	25	26	8·0	150·0	65·0	2·257902	KNOWN	0·336	0·217
41	25	27	8·0	450·0	65·0	6·773707	KNOWN	0·217	0·140
43	26	28	10·0	430·0	65·0	2·183387	KNOWN	0·248	0·160
40	27	28	8·0	210·0	65·0	3·161063	KNOWN	0·124	0·080
37	27	35	8·0	200·0	65·0	3·010537	KNOWN	0·070	0·045
39	28	29	12·0	220·0	65·0	0·459698	KNOWN	0·250	0·161
47	28	30	8·0	840·0	65·0	12·644254	KNOWN	0·098	0·063
36	35	29	12·0	450·0	65·0	0·940290	KNOWN	0·263	0·170
25	32	31	12·0	320·0	65·0	0·663651	KNOWN	0·238	0·154
57	37	36	12·0	200·0	65·0	0·417907	KNOWN	1·145	0·739

PH-10

Hydrant Discharge = 3,760 gpm

NODE	CONNECTING PIPE NUMBS				ELEV FT	CONSUMPTION CFS	MGD	STATUS CONS	TOT HEAD FT OF H20	STATUS HEAD	PRES HEAD FT OF H20
1	1	42	0	0	40·0	6·016	3·881	UNKWN	240·500	KNOWN	200·500
2	1	2	56	0	210·0	-1·674	-1·080	KNOWN	234·067	UNKWN	24·067
3	3	49	48	5	185·0	-2·139	-1·380	KNOWN	232·800	UNKWN	47·800
4	2	3	38	0	200·0	-0·930	-0·600	KNOWN	233·270	UNKWN	33·270
5	29	30	4	0	120·0	-0·023	-0·015	KNOWN	235·513	UNKWN	115·513
6	29	28	27	0	100·0	-0·023	-0·015	KNOWN	237·201	UNKWN	137·201
7	28	22	18	0	80·0	-0·186	-0·120	KNOWN	239·757	UNKWN	159·757
8	22	21	23	0	70·9	4·299	2·774	UNKWN	240·000	KNOWN	169·100
9	21	19	20	0	70·9	0·861	0·555	UNKWN	240·000	KNOWN	169·100
10	19	15	16	0	130·0	-0·023	-0·015	KNOWN	239·730	UNKWN	109·730
11	15	14	13	0	130·0	-0·023	-0·015	KNOWN	239·556	UNKWN	109·556
12	18	14	11	0	180·0	-0·023	-0·015	KNOWN	239·533	UNKWN	59·533
13	13	12	9	0	120·0	-0·023	-0·015	KNOWN	239·539	UNKWN	119·539
14	20	16	17	0	63·0	-0·023	-0·015	KNOWN	239·753	UNKWN	176·753
15	27	31	26	0	60·0	-0·023	-0·015	KNOWN	237·028	UNKWN	177·028
16	12	17	10	0	63·0	-0·023	-0·015	KNOWN	239·554	UNKWN	176·554
17	9	10	8	53	120·0	-0·023	-0·015	KNOWN	239·379	UNKWN	119·379
18	11	8	6	0	200·0	-0·465	-0·300	KNOWN	239·377	UNKWN	39·377
19	6	7	59	0	200·0	-0·009	-0·006	KNOWN	238·333	UNKWN	38·333
20	30	33	32	0	120·0	-0·023	-0·015	KNOWN	234·576	UNKWN	114·576
21	31	34	51	0	110·0	-0·023	-0·015	KNOWN	234·630	UNKWN	124·630
22	33	34	50	35	110·0	-0·023	-0·015	KNOWN	234·457	UNKWN	124·457
23	50	52	24	0	60·0	-0·023	-0·015	KNOWN	234·196	UNKWN	174·196
24	52	45	46	0	40·0	-0·047	-0·030	KNOWN	233·543	UNKWN	193·543
25	42	44	41	0	80·0	-0·023	-0·015	KNOWN	284·288	UNKWN	154·288
26	45	44	43	0	80·0	-0·047	-0·030	KNOWN	233·703	UNKWN	153·703
27	41	40	37	0	120·0	-0·023	-0·015	KNOWN	233·510	UNKWN	113·510
28	43	40	39	47	120·0	-0·023	-0·015	KNOWN	233·373	UNKWN	113·373
29	49	38	32	39	140·0	-0·009	-0·006	KNOWN	233·307	UNKWN	93·307
30	48	46	47	0	70·0	-0·139	-0·090	KNOWN	232·902	UNKWN	162·902
31	26	25	0	0	40·0	-0·023	-0·015	KNOWN	239·779	UNKWN	199·779
32	23	25	0	0	40·0	-0·023	-0·015	KNOWN	239·874	UNKWN	199·874
33	53	7	0	0	120·0	-0·023	-0·015	KNOWN	239·236	UNKWN	119·236
34	51	24	0	0	60·0	-0·023	-0·015	KNOWN	234·205	UNKWN	174·205
35	35	37	36	0	130·0	-0·023	-0·015	KNOWN	233·464	UNKWN	103·464
36	5	57	0	0	185·0	-1·674	-1·080	KNOWN	232·819	UNKWN	47·819
37	57	58	0	0	180·0	0·000	0·000	KNOWN	234·163	UNKWN	54·163
38	59	58	0	0	175·0	0·000	0·000	KNOWN	236·181	UNKWN	61·181
39	4	54	0	0	180·0	0·000	0·000	KNOWN	232·557	UNKWN	52·557
40	56	55	0	0	212·0	-1·674	-1·080	KNOWN	231·747	UNKWN	19·747
41	54	55	0	0	212·0	-1·671	-1·078	KNOWN	231·623	UNKWN	19·623

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	- DISCHARGE - CFS	MGD
1	1	2	20·0	1750·0	65·0	0·303868	KNOWN	5·199	3·354
42	1	25	8·0	600·0	65·0	9·031610	KNOWN	0·817	0·527
2	2	4	12·0	200·0	65·0	0·417907	KNOWN	1·417	0·914
56	2	40	12·0	280·0	65·0	0·585070	KNOWN	2·104	1·356
3	4	3	12·0	380·0	65·0	0·794023	KNOWN	0·753	0·486
49	29	3	12·0	460·0	65·0	1·002976	KNOWN	0·692	0·446
48	30	3	16·0	750·0	65·0	0·386064	KNOWN	0·488	0·315
5	36	3	12·0	180·0	65·0	0·376116	KNOWN	0·197	0·127
38	29	4	12·0	210·0	65·0	0·438802	KNOWN	0·264	0·170
29	6	5	12·0	230·0	65·0	0·480593	KNOWN	1·971	1·272
30	5	20	12·0	850·0	65·0	1·776104	KNOWN	0·708	0·457
4	5	39	12·0	950·0	65·0	1·985058	KNOWN	1·240	0·800
28	7	6	12·0	320·0	65·0	0·668651	KNOWN	2·063	1·331
27	6	15	6·0	410·0	65·0	25·052403	KNOWN	0·068	0·044
22	8	7	24·0	270·0	65·0	0·019293	KNOWN	3·927	2·534
18	7	12	24·0	1200·0	65·0	0·085746	KNOWN	1·679	1·083
21	8	9	12·0	130·0	65·0	0·271639	KNOWN	0·000	0·000
23	8	32	16·0	1530·0	65·0	0·787570	KNOWN	0·372	0·240
19	9	10	12·0	700·0	65·0	1·462674	KNOWN	0·402	0·259
20	9	14	12·0	500·0	65·0	1·044767	KNOWN	0·459	0·296
15	10	11	12·0	450·0	65·0	0·940290	KNOWN	0·402	0·259
16	14	10	6·0	360·0	65·0	23·219300	KNOWN	0·024	0·015
14	11	12	12·0	180·0	65·0	0·376116	KNOWN	0·221	0·143
13	11	13	12·0	250·0	65·0	0·522384	KNOWN	0·157	0·101
11	12	18	24·0	680·0	65·0	0·048589	KNOWN	1·877	1·211
12	16	13	12·0	230·0	65·0	0·480593	KNOWN	0·152	0·098
9	13	17	12·0	780·0	65·0	1·629837	KNOWN	0·286	0·184
17	14	16	12·0	490·0	65·0	1·023872	KNOWN	0·413	0·266
31	15	21	8·0	1000·0	65·0	15·052683	KNOWN	0·371	0·239
26	31	15	6·0	360·0	65·0	21·997232	KNOWN	0·325	0·210
10	16	17	12·0	1200·0	65·0	2·507441	KNOWN	0·238	0·153
8	17	18	12·0	280·0	65·0	0·585070	KNOWN	0·042	0·027
53	17	33	12·0	290·0	65·0	0·605965	KNOWN	0·459	0·296
6	18	19	12·0	250·0	65·0	0·522384	KNOWN	1·454	0·938
7	33	19	8·0	280·0	65·0	4·214751	KNOWN	0·435	0·281
59	19	38	12·0	320·0	65·0	0·668651	KNOWN	1·880	1·213
33	20	22	12·0	250·0	65·0	0·522384	KNOWN	0·449	0·290
32	20	29	8·0	1230·0	65·0	18·514600	KNOWN	0·235	0·152
34	21	22	8·0	230·0	65·0	3·462117	KNOWN	0·198	0·128
51	21	34	8·0	950·0	65·0	14·300049	KNOWN	0·150	0·097
50	22	23	12·0	1000·0	65·0	2·089534	KNOWN	0·326	0·210
35	22	35	8·0	620·0	65·0	9·332664	KNOWN	0·298	0·192
52	23	24	12·0	1500·0	65·0	3·134301	KNOWN	0·429	0·277
24	34	23	12·0	200·0	65·0	0·417907	KNOWN	0·126	0·082
45	26	24	6·0	310·0	65·0	18·942061	KNOWN	0·076	0·049
46	24	30	12·0	1300·0	65·0	2·716395	KNOWN	0·458	0·296
44	25	26	8·0	150·0	65·0	2·257902	KNOWN	0·482	0·311
41	25	27	8·0	450·0	65·0	6·773707	KNOWN	0·311	0·201
43	26	28	10·0	430·0	65·0	2·183387	KNOWN	0·360	0·232
40	27	28	8·0	210·0	65·0	3·161063	KNOWN	0·183	0·118
37	27	35	8·0	200·0	65·0	3·010537	KNOWN	0·105	0·067
39	28	29	12·0	220·0	65·0	0·459698	KNOWN	0·351	0·226
47	28	30	8·0	840·0	65·0	12·644254	KNOWN	0·169	0·109
36	35	29	12·0	450·0	65·0	0·940290	KNOWN	0·380	0·245
25	32	31	12·0	320·0	65·0	0·666651	KNOWN	0·349	0·225
57	37	36	12·0	200·0	65·0	0·417907	KNOWN	1·213	1·213
58	38	37	12·0	300·0	65·0	0·626360	KNOWN	1·880	1·213
54	39	41	12·0	300·0	65·0	0·626360	KNOWN	240	0·800
55	40	41	12·0	280·0	65·0	0·585070	KNOWN	0·431	0·278

PH-11

Hydrant Discharge = 4,450 gpm

NODE	CONNECTING PIPE NUMBS				ELEV FT	CONSUMPTION CFS	MGD	STATUS CONS	TOT HEAD FT OF H2O	STATUS HEAD	PRES HEAD FT OF H2O
1	1	42	0	0	40.0	6.895	4.448	UNKWN	240.500	KNOWN	200.500
2	1	2	56	0	210.0	-1.674	-1.080	KNOWN	232.165	UNKWN	22.165
3	3	49	48	5	185.0	-2.139	-1.380	KNOWN	231.196	UNKWN	46.196
4	2	3	38	0	200.0	-0.930	-0.600	KNOWN	231.553	UNKWN	31.553
5	29	30	4	0	120.0	-0.023	-0.015	KNOWN	233.192	UNKWN	113.192
6	29	28	27	0	100.0	-0.023	-0.015	KNOWN	235.829	UNKWN	135.829
7	28	22	18	0	80.0	-0.186	-0.120	KNOWN	239.680	UNKWN	159.680
8	22	21	23	0	70.9	4.997	3.224	UNKWN	240.000	KNOWN	169.100
9	21	19	20	0	70.9	0.955	0.616	UNKWN	240.000	KNOWN	169.100
10	19	15	16	0	130.0	-0.023	-0.015	KNOWN	239.672	UNKWN	109.672
11	15	14	13	0	130.0	-0.023	-0.015	KNOWN	239.458	UNKWN	109.458
12	18	14	11	0	180.0	-0.023	-0.015	KNOWN	239.427	UNKWN	59.427
13	13	12	9	0	120.0	-0.023	-0.015	KNOWN	239.440	UNKWN	119.440
14	20	16	17	0	63.0	-0.023	-0.015	KNOWN	239.701	UNKWN	176.701
15	27	31	26	0	60.0	-0.023	-0.015	KNOWN	235.754	UNKWN	175.754
16	12	17	10	0	63.0	-0.023	-0.015	KNOWN	239.459	UNKWN	176.459
17	9	10	8	53	120.0	-0.023	-0.015	KNOWN	239.248	UNKWN	119.248
18	11	8	6	0	200.0	-0.465	-0.300	KNOWN	239.246	UNKWN	39.246
19	6	7	59	0	200.0	-0.009	-0.006	KNOWN	237.977	UNKWN	37.977
20	30	33	32	0	120.0	-0.023	-0.015	KNOWN	232.613	UNKWN	112.613
21	31	34	51	0	110.0	-0.023	-0.015	KNOWN	232.799	UNKWN	122.799
22	33	34	50	35	110.0	-0.023	-0.015	KNOWN	232.550	UNKWN	122.550
23	50	52	24	0	60.0	-0.023	-0.015	KNOWN	232.362	UNKWN	172.362
24	52	45	46	0	40.0	-0.047	-0.030	KNOWN	231.847	UNKWN	191.847
25	42	44	41	0	80.0	-0.023	-0.015	KNOWN	232.824	UNKWN	152.824
26	45	44	43	0	80.0	-0.047	-0.030	KNOWN	232.099	UNKWN	152.099
27	41	40	37	0	120.0	-0.023	-0.015	KNOWN	231.849	UNKWN	111.849
28	43	40	39	47	120.0	-0.023	-0.015	KNOWN	231.703	UNKWN	111.703
29	49	38	32	39	140.0	-0.009	-0.006	KNOWN	231.618	UNKWN	91.618
30	48	46	47	0	70.0	-0.139	-0.090	KNOWN	231.283	UNKWN	161.283
31	26	25	0	0	40.0	-0.023	-0.015	KNOWN	239.694	UNKWN	199.694
32	23	25	0	0	40.0	-0.023	-0.015	KNOWN	239.827	UNKWN	199.827
33	53	7	0	0	120.0	-0.023	-0.015	KNOWN	239.076	UNKWN	119.076
34	51	24	0	0	60.0	-0.023	-0.015	KNOWN	232.371	UNKWN	172.371
35	35	37	36	0	130.0	-0.023	-0.015	KNOWN	231.771	UNKWN	101.771
36	5	57	0	0	185.0	-1.674	-1.080	KNOWN	231.270	UNKWN	46.270
37	57	58	0	0	150.0	0.000	0.000	KNOWN	232.906	UNKWN	52.906
38	59	58	0	0	175.0	0.000	0.000	KNOWN	235.360	UNKWN	60.360
39	4	54	0	0	180.0	-1.671	-1.078	KNOWN	226.430	UNKWN	46.430
40	56	55	0	0	212.0	-1.674	-1.080	KNOWN	227.473	UNKWN	15.473
41	54	55	0	0	212.0	-1.671	-1.078	KNOWN	226.377	UNKWN	14.377

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	- DISCHARGE - CFS	MGD
1	1	2	20.0	1750.0	65.0	0.303868	KNOWN	5.979	3.858
42	1	25	8.0	600.0	65.0	9.031610	KNOWN	0.916	0.591
2	2	4	12.0	200.0	65.0	0.417907	KNOWN	1.228	0.792
56	2	40	12.0	280.0	65.0	0.585070	KNOWN	3.078	1.986
3	4	3	12.0	380.0	65.0	0.794023	KNOWN	0.650	0.419
49	29	3	12.0	480.0	65.0	1.002976	KNOWN	0.626	0.404
48	30	3	16.0	750.0	65.0	0.386064	KNOWN	0.447	0.288
5	36	3	12.0	180.0	65.0	0.376116	KNOWN	0.417	0.269
38	29	4	12.0	210.0	65.0	0.438802	KNOWN	0.354	0.229
29	6	5	12.0	230.0	65.0	0.480593	KNOWN	2.508	1.618
30	5	20	12.0	850.0	65.0	1.776104	KNOWN	0.546	0.352
4	5	39	12.0	950.0	65.0	1.965058	KNOWN	1.938	1.251
28	7	6	12.0	320.0	65.0	0.668651	KNOWN	2.574	1.661
27	6	15	6.0	410.0	65.0	25.052403	KNOWN	0.043	0.028
22	8	7	24.0	270.0	65.0	0.019293	KNOWN	4.555	2.939
18	7	12	24.0	1200.0	65.0	0.085746	KNOWN	1.795	1.158
21	8	9	12.0	130.0	65.0	0.271639	KNOWN	0.000	0.000
23	8	32	16.0	1530.0	65.0	0.787570	KNOWN	0.442	0.285
19	9	10	12.0	700.0	65.0	1.462674	KNOWN	0.446	0.288
20	9	14	12.0	500.0	65.0	1.044767	KNOWN	0.509	0.328
15	10	11	12.0	450.0	65.0	0.940290	KNOWN	0.449	0.290
16	14	10	6.0	380.0	65.0	23.219300	KNOWN	0.027	0.017
14	11	12	12.0	180.0	65.0	0.376116	KNOWN	0.262	0.169
13	11	13	12.0	250.0	65.0	0.522384	KNOWN	0.165	0.106
11	12	18	24.0	630.0	65.0	0.048589	KNOWN	2.033	1.312
12	16	13	12.0	230.0	65.0	0.480593	KNOWN	0.173	0.112
9	13	17	12.0	780.0	65.0	1.629837	KNOWN	0.315	0.203
17	14	16	12.0	490.0	65.0	1.023672	KNOWN	0.459	0.296
31	15	21	8.0	1000.0	65.0	15.052683	KNOWN	0.415	0.268
26	31	15	6.0	360.0	65.0	21.997232	KNOWN	0.395	0.255
10	16	17	12.0	1200.0	65.0	2.507441	KNOWN	0.262	0.169
8	17	18	12.0	280.0	65.0	0.585070	KNOWN	0.047	0.030
53	17	33	12.0	290.0	65.0	0.605965	KNOWN	0.507	0.327
6	18	19	12.0	250.0	65.0	0.522384	KNOWN	1.615	1.042
7	33	19	8.0	280.0	65.0	4.214751	KNOWN	0.484	0.312
59	19	38	12.0	320.0	65.0	0.669651	KNOWN	2.090	1.348
33	20	22	12.0	250.0	65.0	0.522384	KNOWN	0.316	0.204
32	20	29	8.0	1230.0	65.0	18.514800	KNOWN	0.206	0.133
34	21	22	8.0	230.0	65.0	3.462117	KNOWN	0.241	0.156
51	21	34	8.0	950.0	65.0	14.300049	KNOWN	0.150	0.097
50	22	23	12.0	1000.0	65.0	2.089534	KNOWN	0.273	0.176
35	22	35	8.0	620.0	65.0	9.332664	KNOWN	0.262	0.169
52	23	24	12.0	1500.0	65.0	3.134301	KNOWN	0.377	0.243
24	34	23	12.0	200.0	65.0	0.417907	KNOWN	0.127	0.082
45	26	24	6.0	310.0	65.0	18.942061	KNOWN	0.097	0.063
46	24	30	12.0	1300.0	65.0	2.716395	KNOWN	0.428	0.276
44	25	26	8.0	150.0	65.0	2.257902	KNOWN	0.541	0.349
41	25	27	8.0	450.0	65.0	6.773707	KNOWN	0.351	0.227
43	26	28	10.0	430.0	65.0	2.183387	KNOWN	0.398	0.257
40	27	28	8.0	210.0	65.0	3.161063	KNOWN	0.189	0.122
37	27	35	8.0	200.0	65.0	3.010537	KNOWN	0.138	0.089
39	28	29	12.0	220.0	65.0	0.459698	KNOWN	0.404	0.260
47	28	30	8.0	840.0	65.0	12.644254	KNOWN	0.159	0.103
36	35	29	12.0	450.0	65.0	0.940290	KNOWN	0.376	0.242
25	32	31	12.0	320.0	65.0	0.668651	KNOWN	0.418	0.270
57	37	36	12.0	200.0	65.0	0.417907	KNOWN	2.089	1.348
58	38	37	12.0	300.0	65.0	0.626860	KNOWN	2.090	1.348
54	39	41	12.0	300.0	65.0	0.626860	KNOWN	0.264	0.170
55	40	41	12.0	280.0	65.0	0.585070	KNOWN	1.404	0.906

PH-12

Average Normal Demand

NODE	CONNECTING PIPE NUMBS				ELEV FT	CONSUMPTION CFS	MGD	STATUS CONS	TOT HEAD FT OF H2O	STATUS HEAD	PRES HEAD FT OF H2O
1	1	42	0	0	40.0	1.741	1.123	UNKWN	241.000	KNOWN	201.000
2	1	2	4	0	210.0	-0.480	-0.310	KNOWN	240.375	UNKWN	30.375
3	3	5	49	48	185.0	-0.155	-0.100	KNOWN	240.097	UNKWN	55.097
4	2	3	38	0	200.0	-0.480	-0.310	KNOWN	240.130	UNKWN	40.130
5	4	29	30	0	120.0	-0.008	-0.005	KNOWN	240.092	UNKWN	120.092
6	29	28	27	0	100.0	-0.008	-0.005	KNOWN	240.052	UNKWN	140.052
7	28	22	18	0	80.0	-0.062	-0.040	KNOWN	240.002	UNKWN	160.002
8	22	21	23	0	70.9	-0.277	-0.179	UNKWN	240.000	KNOWN	169.100
9	21	19	20	0	70.9	-0.030	-0.020	UNKWN	240.000	KNOWN	169.100
10	19	15	16	0	130.0	-0.008	-0.005	KNOWN	240.001	UNKWN	110.001
11	15	14	13	0	130.0	-0.008	-0.005	KNOWN	240.002	UNKWN	110.002
12	18	14	11	0	180.0	-0.008	-0.005	KNOWN	240.002	UNKWN	60.002
13	13	12	9	0	120.0	-0.008	-0.005	KNOWN	240.002	UNKWN	120.002
14	20	16	17	0	63.0	-0.008	-0.005	KNOWN	240.000	UNKWN	177.000
15	27	31	26	0	60.0	-0.008	-0.005	KNOWN	240.051	UNKWN	180.051
16	12	17	10	0	63.0	-0.008	-0.005	KNOWN	240.001	UNKWN	177.001
17	9	10	8	53	120.0	-0.008	-0.005	KNOWN	240.003	UNKWN	120.003
18	11	8	6	0	200.0	-0.002	-0.001	KNOWN	240.003	UNKWN	40.003
19	5	6	7	0	200.0	-0.003	-0.002	KNOWN	240.014	UNKWN	40.014
20	30	33	32	0	120.0	-0.008	-0.005	KNOWN	240.094	UNKWN	120.094
21	31	34	51	0	110.0	-0.008	-0.005	KNOWN	240.088	UNKWN	130.088
22	33	34	50	35	110.0	-0.008	-0.005	KNOWN	240.094	UNKWN	130.094
23	50	52	24	0	60.0	-0.008	-0.005	KNOWN	240.094	UNKWN	180.094
24	52	45	46	0	40.0	-0.015	-0.010	KNOWN	240.097	UNKWN	200.097
25	42	44	41	0	80.0	-0.008	-0.005	KNOWN	240.232	UNKWN	160.232
26	45	44	43	0	80.0	-0.015	-0.010	KNOWN	240.158	UNKWN	160.158
27	41	40	37	0	120.0	-0.008	-0.005	KNOWN	240.137	UNKWN	120.137
28	43	40	39	47	120.0	-0.008	-0.005	KNOWN	240.129	UNKWN	120.129
29	49	38	32	39	140.0	-0.003	-0.002	KNOWN	240.124	UNKWN	100.124
30	48	46	47	0	70.0	-0.047	-0.030	KNOWN	240.097	UNKWN	170.097
31	26	25	0	0	40.0	-0.008	-0.005	KNOWN	240.002	UNKWN	200.002
32	23	25	0	0	40.0	-0.008	-0.005	KNOWN	240.001	UNKWN	200.001
33	53	7	0	0	120.0	-0.008	-0.005	KNOWN	240.004	UNKWN	120.004
34	51	24	0	0	60.0	-0.008	-0.005	KNOWN	240.093	UNKWN	180.093
35	35	37	0	0	130.0	-0.008	-0.005	KNOWN	240.124	UNKWN	110.124

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	- DISCHARGE - CFS	MGD
1	1	2	20.0	1750.0	65.0	0.303868	KNOWN	1.476	0.952
42	1	25	8.0	600.0	65.0	9.031610	KNOWN	0.264	0.171
2	2	4	12.0	200.0	65.0	0.417907	KNOWN	0.750	0.484
4	2	5	12.0	1820.0	65.0	3.802952	KNOWN	0.246	0.159
3	4	3	12.0	380.0	65.0	0.794023	KNOWN	0.179	0.115
5	3	19	12.0	1100.0	65.0	2.298488	KNOWN	0.166	0.107
49	29	3	12.0	480.0	65.0	1.002976	KNOWN	0.144	0.093
48	30	3	16.0	750.0	65.0	0.386064	KNOWN	0.008	0.005
38	4	29	12.0	210.0	65.0	0.438802	KNOWN	0.091	0.058
29	5	6	12.0	230.0	65.0	0.480593	KNOWN	0.261	0.169
30	20	5	12.0	850.0	65.0	1.776104	KNOWN	0.023	0.015
28	6	7	12.0	320.0	65.0	0.668651	KNOWN	0.248	0.160
27	6	15	6.0	410.0	65.0	25.052403	KNOWN	0.005	0.003
22	7	8	24.0	270.0	65.0	0.019293	KNOWN	0.255	0.165
18	12	7	24.0	1200.0	65.0	0.085746	KNOWN	0.069	0.045
21	8	9	12.0	130.0	65.0	0.271639	KNOWN	0.000	0.000
23	32	8	16.0	1530.0	65.0	0.787570	KNOWN	0.021	0.014
19	10	9	12.0	700.0	65.0	1.462674	KNOWN	0.015	0.009
20	14	9	12.0	500.0	65.0	1.044767	KNOWN	0.016	0.010
15	11	10	12.0	450.0	65.0	0.940290	KNOWN	0.024	0.015
16	10	14	6.0	380.0	65.0	23.219300	KNOWN	0.001	0.001
14	12	11	12.0	180.0	65.0	0.376116	KNOWN	0.032	0.020
13	11	13	12.0	250.0	65.0	0.522384	KNOWN	0.001	0.001
11	18	12	24.0	680.0	65.0	0.048589	KNOWN	0.109	0.070
12	13	16	12.0	230.0	65.0	0.480593	KNOWN	0.013	0.008
9	17	13	12.0	780.0	65.0	1.629837	KNOWN	0.020	0.013
17	16	14	12.0	490.0	65.0	1.023872	KNOWN	0.022	0.014
31	21	15	8.0	1000.0	65.0	15.052683	KNOWN	0.039	0.025
26	15	31	6.0	360.0	65.0	21.997232	KNOWN	0.037	0.024
10	17	16	12.0	1200.0	65.0	2.507441	KNOWN	0.017	0.011
8	18	17	12.0	280.0	65.0	0.585070	KNOWN	0.014	0.009
53	33	17	12.0	290.0	65.0	0.605965	KNOWN	0.031	0.020
6	19	18	12.0	250.0	65.0	0.522384	KNOWN	0.124	0.080
7	19	33	8.0	280.0	65.0	4.214751	KNOWN	0.039	0.025
33	20	22	12.0	250.0	65.0	0.522384	KNOWN	0.001	0.001
32	29	20	8.0	1230.0	65.0	18.514800	KNOWN	0.031	0.020
34	22	21	8.0	230.0	65.0	3.462117	KNOWN	0.033	0.021
51	34	21	8.0	950.0	65.0	14.300049	KNOWN	0.014	0.009
50	22	23	12.0	1000.0	65.0	2.089534	KNOWN	0.005	0.004
35	35	22	8.0	620.0	65.0	9.332664	KNOWN	0.045	0.029
52	24	23	12.0	1500.0	65.0	3.134301	KNOWN	0.025	0.016
24	23	34	12.0	200.0	65.0	0.417907	KNOWN	0.022	0.014
45	26	24	6.0	310.0	65.0	18.942061	KNOWN	0.045	0.029
46	24	30	12.0	1300.0	65.0	2.716395	KNOWN	0.006	0.004
44	25	26	8.0	150.0	65.0	2.257902	KNOWN	0.157	0.101
41	25	27	8.0	450.0	65.0	6.773707	KNOWN	0.099	0.064
43	26	28	10.0	430.0	65.0	2.183387	KNOWN	0.096	0.062
40	27	28	8.0	210.0	65.0	3.161063	KNOWN	0.039	0.025
37	27	35	8.0	200.0	65.0	3.010537	KNOWN	0.053	0.034
39	28	29	12.0	220.0	65.0	0.459698	KNOWN	0.088	0.056
47	28	30	8.0	840.0	65.0	12.644254	KNOWN	0.040	0.026
25	31	32	12.0	320.0	65.0	0.668651	KNOWN	0.029	0.019

PH-13

Affect of 6-inch Connection

NODE	CONNECTING PIPE NUMBS				ELEV FT	CONSUMPTION CFS	MGD	STATUS CONS	TOT HEAD FT OF H2O	STATUS HEAD	PRES HEAD FT OF H2O
1	1	42	0	0	40.0	6.161	3.975	UNKWN	240.500	KNOWN	200.500
2	1	2	56	0	210.0	-1.674	-1.080	KNOWN	233.791	UNKWN	23.791
3	3	49	48	5	185.0	-2.139	-1.380	KNOWN	232.273	UNKWN	47.273
4	2	3	38	0	200.0	-0.930	-0.600	KNOWN	232.854	UNKWN	32.854
5	29	30	4	0	120.0	-0.023	-0.015	KNOWN	235.324	UNKWN	115.324
6	29	28	27	0	100.0	-0.023	-0.015	KNOWN	237.100	UNKWN	137.100
7	28	22	18	0	80.0	-0.186	-0.120	KNOWN	239.795	UNKWN	159.795
8	22	21	23	0	70.9	3.963	2.557	UNKWN	240.000	KNOWN	169.100
9	21	19	20	0	70.9	1.055	0.681	UNKWN	240.000	KNOWN	169.100
10	19	15	16	0	130.0	-0.023	-0.015	KNOWN	239.681	UNKWN	109.681
11	15	14	13	0	130.0	-0.023	-0.015	KNOWN	239.537	UNKWN	109.537
12	18	14	11	0	180.0	-0.023	-0.015	KNOWN	239.661	UNKWN	59.661
13	13	12	9	0	120.0	-0.023	-0.015	KNOWN	239.119	UNKWN	119.119
14	20	16	17	0	63.0	-0.023	-0.015	KNOWN	239.575	UNKWN	176.575
15	27	31	26	0	60.0	-0.023	-0.015	KNOWN	236.895	UNKWN	176.895
16	12	17	10	0	63.0	-0.023	-0.015	KNOWN	239.119	UNKWN	176.119
17	9	10	8	53	120.0	-0.023	-0.015	KNOWN	237.966	UNKWN	117.966
18	11	8	6	0	200.0	-0.465	-0.300	KNOWN	237.426	UNKWN	37.426
19	6	7	59	0	200.0	-0.009	-0.006	KNOWN	236.699	UNKWN	36.699
20	30	33	32	0	120.0	-0.023	-0.015	KNOWN	234.281	UNKWN	114.281
21	31	34	51	0	110.0	-0.023	-0.015	KNOWN	234.330	UNKWN	124.330
22	33	34	50	35	110.0	-0.023	-0.015	KNOWN	234.147	UNKWN	124.147
23	50	52	24	0	60.0	-0.023	-0.015	KNOWN	233.855	UNKWN	173.855
24	52	45	46	0	40.0	-0.047	-0.030	KNOWN	233.121	UNKWN	193.121
25	42	44	41	0	80.0	-0.023	-0.015	KNOWN	233.922	UNKWN	153.922
26	45	44	43	0	80.0	-0.047	-0.030	KNOWN	233.299	UNKWN	153.299
27	41	40	37	0	120.0	-0.023	-0.015	KNOWN	233.098	UNKWN	113.098
28	43	40	39	47	120.0	-0.023	-0.015	KNOWN	232.950	UNKWN	112.950
29	49	38	32	39	140.0	-0.009	-0.006	KNOWN	232.882	UNKWN	92.882
30	48	46	47	0	70.0	-0.139	-0.090	KNOWN	232.395	UNKWN	162.395
31	26	25	0	0	40.0	-0.023	-0.015	KNOWN	239.770	UNKWN	199.770
32	23	25	0	0	40.0	-0.023	-0.015	KNOWN	239.869	UNKWN	199.869
33	53	7	0	0	120.0	-0.023	-0.015	KNOWN	237.794	UNKWN	117.794
34	51	24	0	0	60.0	-0.023	-0.015	KNOWN	233.865	UNKWN	173.865
35	35	37	36	0	130.0	-0.023	-0.015	KNOWN	233.052	UNKWN	103.052
36	5	57	0	0	185.0	-1.674	-1.080	KNOWN	232.273	UNKWN	47.273
37	57	58	0	0	180.0	0.000	0.000	KNOWN	233.353	UNKWN	53.353
38	59	58	0	0	175.0	0.000	0.000	KNOWN	234.973	UNKWN	59.973
39	4	54	0	0	180.0	0.000	0.000	KNOWN	232.317	UNKWN	52.317
40	56	55	0	0	212.0	-1.674	-1.080	KNOWN	231.436	UNKWN	19.486
41	54	55	0	0	212.0	-1.674	-1.080	KNOWN	231.367	UNKWN	19.367

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	- DISCHARGE - CFS	MGD
1	1	2	20.0	1750.0	65.0	0.303868	KNOWN	6.318	3.431
42	1	25	8.0	600.0	65.0	9.031610	KNOWN	0.843	0.544
2	2	4	12.0	200.0	65.0	0.417907	KNOWN	1.547	0.998
56	2	40	12.0	280.0	65.0	0.585070	KNOWN	2.097	1.353
3	4	3	12.0	380.0	65.0	0.794023	KNOWN	0.844	0.545
49	29	3	12.0	480.0	65.0	1.002976	KNOWN	0.764	0.493
48	30	3	16.0	750.0	65.0	0.386064	KNOWN	0.536	0.346
5	36	3	12.0	180.0	65.0	0.376116	KNOWN	0.005	0.003
38	29	4	12.0	210.0	65.0	0.438802	KNOWN	0.227	0.147
29	6	5	12.0	230.0	65.0	0.480593	KNOWN	2.025	1.307
30	5	20	12.0	850.0	65.0	1.776104	KNOWN	0.750	0.484
4	5	39	12.0	950.0	65.0	1.985056	KNOWN	1.251	0.807
28	7	6	12.0	320.0	65.0	0.668651	KNOWN	2.123	1.370
27	6	15	6.0	410.0	65.0	25.052403	KNOWN	0.075	0.048
22	8	7	24.0	270.0	65.0	0.019293	KNOWN	3.583	2.312
18	7	12	24.0	1200.0	65.0	0.085746	KNOWN	1.274	0.822
21	8	9	12.0	130.0	65.0	0.271639	KNOWN	0.000	0.000
23	8	32	16.0	1530.0	65.0	0.787570	KNOWN	0.380	0.245
19	9	10	12.0	700.0	65.0	1.462674	KNOWN	0.440	0.284
20	9	14	12.0	500.0	65.0	1.044767	KNOWN	0.615	0.397
15	10	11	12.0	450.0	65.0	0.940290	KNOWN	0.362	0.234
16	10	14	6.0	380.0	65.0	23.219300	KNOWN	0.054	0.035
14	12	11	12.0	180.0	65.0	0.376116	KNOWN	0.548	0.353
13	11	13	12.0	250.0	65.0	0.522384	KNOWN	0.887	0.572
11	12	18	8.0	680.0	104.0	4.290430	KNOWN	0.703	0.454
12	13	16	12.0	230.0	65.0	0.480593	KNOWN	0.030	0.019
9	13	17	12.0	780.0	65.0	1.629837	KNOWN	0.829	0.535
17	14	16	12.0	490.0	65.0	1.023872	KNOWN	0.646	0.417
31	15	21	8.0	1000.0	65.0	15.052683	KNOWN	0.385	0.248
26	31	15	6.0	360.0	65.0	21.997232	KNOWN	0.333	0.215
10	16	17	12.0	1200.0	65.0	2.507441	KNOWN	0.657	0.424
8	17	18	12.0	280.0	65.0	0.585070	KNOWN	0.958	0.618
53	17	33	12.0	290.0	65.0	0.605965	KNOWN	0.507	0.327
6	18	19	12.0	250.0	65.0	0.522384	KNOWN	1.196	0.771
7	33	19	8.0	280.0	65.0	4.214751	KNOWN	0.483	0.312
59	19	38	12.0	320.0	65.0	0.668651	KNOWN	1.669	1.077
33	20	22	12.0	250.0	65.0	0.522384	KNOWN	0.479	0.309
32	20	29	8.0	1230.0	65.0	18.514800	KNOWN	0.248	0.160
34	21	22	8.0	230.0	65.0	3.462117	KNOWN	0.204	0.132
51	21	34	8.0	950.0	65.0	14.300049	KNOWN	0.157	0.101
50	22	23	12.0	1000.0	65.0	2.089534	KNOWN	0.346	0.223
35	22	35	3.0	620.0	65.0	9.332664	KNOWN	0.314	0.203
52	23	24	12.0	1500.0	65.0	3.134301	KNOWN	0.457	0.295
24	34	23	12.0	200.0	65.0	0.417907	KNOWN	0.134	0.086
45	26	24	6.0	310.0	65.0	18.942061	KNOWN	0.080	0.052
46	24	30	12.0	1300.0	65.0	2.716395	KNOWN	0.490	0.316
44	25	26	8.0	150.0	65.0	2.257902	KNOWN	0.499	0.322
41	25	27	8.0	450.0	65.0	6.773707	KNOWN	0.321	0.207
43	26	28	10.0	430.0	65.0	2.183387	KNOWN	0.372	0.240
40	27	28	8.0	210.0	65.0	3.161063	KNOWN	0.192	0.124
37	27	35	8.0	200.0	65.0	3.010537	KNOWN	0.105	0.068
39	28	29	12.0	220.0	65.0	0.459698	KNOWN	0.356	0.229
47	28	30	8.0	840.0	65.0	12.644254	KNOWN	0.185	0.119
36	35	29	12.0	450.0	65.0	0.940290	KNOWN	0.397	0.256
25	32	31	12.0	320.0	65.0	0.668651	KNOWN	0.357	0.230
57	37	36	12.0	200.0	65.0	0.417907	KNOWN	1.669	1.077

PH-14

Huntington Avenue Out of Service

NODE	CONNECTING PIPE NUMBS				ELEV FT	CONSUMPTION CFS	MGD	STATUS CONS	TOT HEAD FT OF H2O	STATUS HEAD	PRES HEAD FT OF H2O
1	1	42	0	0	40.0	0.000	0.000	KNOWN	202.319	UNKWN	162.319
2	1	2	56	0	210.0	-1.674	-1.080	KNOWN	202.239	UNKWN	-7.761
3	3	49	48	5	185.0	-2.139	-1.380	KNOWN	205.265	UNKWN	20.265
4	2	3	38	0	200.0	-0.930	-0.600	KNOWN	203.859	UNKWN	3.859
5	29	30	4	0	120.0	-0.023	-0.015	KNOWN	215.947	UNKWN	95.947
6	29	28	27	0	100.0	-0.023	-0.015	KNOWN	222.576	UNKWN	122.576
7	28	22	18	0	80.0	-0.186	-0.120	KNOWN	232.537	UNKWN	152.537
8	22	21	23	0	70.9	8.010	5.168	UNKWN	233.300	KNOWN	162.400
9	21	19	20	0	70.9	1.491	0.962	UNKWN	233.300	KNOWN	162.400
10	19	15	16	0	130.0	-0.023	-0.015	KNOWN	232.550	UNKWN	102.550
11	15	14	13	0	130.0	-0.023	-0.015	KNOWN	232.043	UNKWN	102.043
12	18	14	11	0	180.0	-0.023	-0.015	KNOWN	231.960	UNKWN	51.960
13	13	12	9	0	120.0	-0.023	-0.015	KNOWN	232.003	UNKWN	112.003
14	20	16	17	0	63.0	-0.023	-0.015	KNOWN	232.618	UNKWN	169.618
15	27	31	26	0	60.0	-0.023	-0.015	KNOWN	221.812	UNKWN	161.812
16	12	17	10	0	63.0	-0.023	-0.015	KNOWN	232.049	UNKWN	169.049
17	9	10	8	53	120.0	-0.023	-0.015	KNOWN	231.538	UNKWN	111.538
18	11	8	6	0	200.0	-0.465	-0.300	KNOWN	231.536	UNKWN	31.536
19	6	7	59	0	200.0	-0.009	-0.006	KNOWN	228.021	UNKWN	28.021
20	30	33	32	0	120.0	-0.023	-0.015	KNOWN	211.485	UNKWN	91.485
21	31	34	51	0	110.0	-0.023	-0.015	KNOWN	211.703	UNKWN	101.703
22	33	34	50	35	110.0	-0.023	-0.015	KNOWN	210.911	UNKWN	100.911
23	50	52	24	0	60.0	-0.023	-0.015	KNOWN	209.793	UNKWN	149.793
24	52	45	46	0	40.0	-0.047	-0.030	KNOWN	206.661	UNKWN	166.661
25	42	44	41	0	80.0	-0.023	-0.015	KNOWN	204.669	UNKWN	124.669
26	45	44	43	0	80.0	-0.047	-0.030	KNOWN	204.942	UNKWN	124.942
27	41	40	37	0	120.0	-0.023	-0.015	KNOWN	204.977	UNKWN	84.977
28	43	40	39	47	120.0	-0.023	-0.015	KNOWN	204.968	UNKWN	84.968
29	49	38	32	39	140.0	-0.009	-0.006	KNOWN	204.964	UNKWN	64.964
30	48	46	47	0	70.0	-0.139	-0.090	KNOWN	205.334	UNKWN	135.334
31	26	25	0	0	40.0	-0.023	-0.015	KNOWN	232.520	UNKWN	192.520
32	23	25	0	0	40.0	-0.023	-0.015	KNOWN	232.866	UNKWN	192.866
33	53	7	0	0	120.0	-0.023	-0.015	KNOWN	231.076	UNKWN	111.076
34	51	24	0	0	60.0	-0.023	-0.015	KNOWN	209.841	UNKWN	149.841
35	35	37	36	0	130.0	-0.023	-0.015	KNOWN	205.215	UNKWN	75.215
36	5	57	0	0	185.0	0.000	0.000	KNOWN	209.361	UNKWN	24.361
37	57	58	0	0	180.0	0.000	0.000	KNOWN	213.913	UNKWN	33.913
38	59	58	0	0	175.0	0.000	0.000	KNOWN	220.739	UNKWN	45.739
39	4	54	0	0	180.0	0.000	0.000	KNOWN	205.458	UNKWN	25.458
40	56	55	0	0	212.0	-1.674	-1.080	KNOWN	201.770	UNKWN	-10.230
41	54	55	0	0	212.0	-1.671	-1.078	KNOWN	202.145	UNKWN	-9.855

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	- DISCHARGE - CFS	MGD
1	1	2	20.0	1750.0	65.0	0.303868	KNOWN	0.484	0.312
42	25	1	8.0	600.0	65.0	9.031610	KNOWN	0.483	0.312
2	4	2	12.0	200.0	65.0	0.417907	KNOWN	2.078	1.341
56	2	40	12.0	280.0	65.0	0.585070	KNOWN	0.888	0.573
3	3	4	12.0	380.0	65.0	0.794023	KNOWN	1.362	0.879
49	3	29	12.0	480.0	65.0	1.002976	KNOWN	0.522	0.337
48	30	3	16.0	750.0	65.0	0.386064	KNOWN	0.393	0.253
5	36	3	12.0	180.0	65.0	0.376116	KNOWN	3.631	2.342
38	29	4	12.0	210.0	65.0	0.438802	KNOWN	1.647	1.062
29	6	5	12.0	230.0	65.0	0.480593	KNOWN	4.125	2.661
30	5	20	12.0	850.0	65.0	1.776104	KNOWN	1.645	1.061
4	5	39	12.0	950.0	65.0	1.985058	KNOWN	2.457	1.585
28	7	6	12.0	320.0	65.0	0.668651	KNOWN	4.300	2.774
27	6	15	6.0	410.0	65.0	25.052403	KNOWN	0.152	0.098
22	8	7	24.0	270.0	65.0	0.019293	KNOWN	7.286	4.701
18	7	12	24.0	1200.0	65.0	0.085746	KNOWN	2.800	1.806
21	8	9	12.0	130.0	65.0	0.271639	KNOWN	0.000	0.000
23	8	32	16.0	1530.0	65.0	0.787570	KNOWN	0.724	0.467
19	9	10	12.0	700.0	65.0	1.462674	KNOWN	0.697	0.450
20	9	14	12.0	500.0	65.0	1.044767	KNOWN	0.794	0.512
15	10	11	12.0	450.0	65.0	0.940290	KNOWN	0.717	0.462
16	14	10	6.0	380.0	65.0	23.219300	KNOWN	0.043	0.028
14	11	12	12.0	180.0	65.0	0.376116	KNOWN	0.443	0.286
13	11	13	12.0	250.0	65.0	0.522384	KNOWN	0.250	0.161
11	12	18	24.0	680.0	65.0	0.048589	KNOWN	3.220	2.077
12	16	13	12.0	230.0	65.0	0.480593	KNOWN	0.281	0.182
9	13	17	12.0	780.0	65.0	1.629837	KNOWN	0.508	0.328
17	14	16	12.0	490.0	65.0	1.023872	KNOWN	0.728	0.470
31	15	21	8.0	1000.0	65.0	15.052683	KNOWN	0.807	0.520
26	31	15	6.0	360.0	65.0	21.997232	KNOWN	0.678	0.437
10	16	17	12.0	1200.0	65.0	2.507441	KNOWN	0.424	0.273
8	17	18	12.0	280.0	65.0	0.585070	KNOWN	0.045	0.029
53	17	33	12.0	290.0	65.0	0.605965	KNOWN	0.864	0.557
6	18	19	12.0	250.0	65.0	0.522384	KNOWN	2.800	1.806
7	33	19	8.0	280.0	65.0	4.214751	KNOWN	0.840	0.542
59	19	38	12.0	320.0	65.0	0.668651	KNOWN	3.631	2.342
33	20	22	12.0	250.0	65.0	0.522384	KNOWN	1.052	0.679
32	20	29	8.0	1230.0	65.0	18.514800	KNOWN	0.569	0.367
34	21	22	8.0	230.0	65.0	3.462117	KNOWN	0.451	0.291
51	21	34	8.0	950.0	65.0	14.300049	KNOWN	0.333	0.215
50	22	23	12.0	1000.0	65.0	2.089534	KNOWN	0.713	0.460
35	22	35	8.0	620.0	65.0	9.332664	KNOWN	0.766	0.494
52	23	24	12.0	1500.0	65.0	3.134301	KNOWN	1.000	0.645
24	34	23	12.0	200.0	65.0	0.417907	KNOWN	0.309	0.200
45	24	26	6.0	310.0	65.0	18.942061	KNOWN	0.274	0.177
46	24	30	12.0	1300.0	65.0	2.716395	KNOWN	0.679	0.438
44	26	25	8.0	150.0	65.0	2.257902	KNOWN	0.319	0.206
41	27	25	8.0	450.0	65.0	6.773707	KNOWN	0.188	0.122
43	28	26	10.0	430.0	65.0	2.183387	KNOWN	0.092	0.059
40	27	28	8.0	210.0	65.0	3.161063	KNOWN	0.043	0.028
37	35	27	8.0	200.0	65.0	3.010537	KNOWN	0.254	0.164
39	28	29	12.0	220.0	65.0	0.459698	KNOWN	0.075	0.048
47	30	28	8.0	840.0	65.0	12.644254	KNOWN	0.148	0.095
36	35	29	12.0	450.0	65.0	0.940290	KNOWN	0.490	0.316
25	32	31	12.0	320.0	65.0	0.668651	KNOWN	0.701	0.452
57	37	36	12.0	200.0	65.0	0.417907	KNOWN	3.631	2.342
58	38	37	12.0	300.0	65.0	0.626860	KNOWN	3.631	2.342
54	39	41	12.0	300.0	65.0	0.626860	KNOWN	2.457	1.585
55	41	40	12.0	280.0	65.0	0.585070	KNOWN	0.786	0.507

PH-15

Heath Street Out of Service

NODE	CONNECTING PIPE NUMBS				ELEV FT	CONSUMPTION STATUS CFS	MGD	CONS	TOT HEAD STATUS FT OF H2O	HEAD	PRES HEAD FT OF H2O
1	1	42	0	0	40.0	9.501	6.130	UNKWN	233.300	KNOWN	193.300
2	1	2	56	0	210.0	-1.674	-1.080	KNOWN	218.625	UNKWN	8.625
3	3	49	48	5	185.0	-2.139	-1.380	KNOWN	213.308	UNKWN	28.308
4	2	3	38	0	200.0	-0.930	-0.600	KNOWN	214.820	UNKWN	14.820
5	29	30	4	0	120.0	-0.023	-0.015	KNOWN	212.675	UNKWN	92.675
6	29	28	27	0	100.0	-0.023	-0.015	KNOWN	212.634	UNKWN	112.634
7	28	22	18	0	80.0	-0.186	-0.120	KNOWN	212.566	UNKWN	132.566
8	22	21	23	0	70.9	0.000	0.000	KNOWN	212.566	UNKWN	141.666
9	21	19	20	0	70.9	0.000	0.000	KNOWN	212.565	UNKWN	141.665
10	19	15	16	0	130.0	-0.023	-0.015	KNOWN	212.564	UNKWN	82.564
11	15	14	13	0	130.0	-0.023	-0.015	KNOWN	212.564	UNKWN	82.564
12	18	14	11	0	180.0	-0.023	-0.015	KNOWN	212.565	UNKWN	32.565
13	13	12	9	0	120.0	-0.023	-0.015	KNOWN	212.564	UNKWN	92.564
14	20	16	17	0	63.0	-0.023	-0.015	KNOWN	212.564	UNKWN	149.564
15	27	31	26	0	62.0	-0.023	-0.015	KNOWN	212.729	UNKWN	152.729
16	12	17	10	0	63.0	-0.023	-0.015	KNOWN	212.564	UNKWN	149.564
17	9	10	8	53	120.0	-0.023	-0.015	KNOWN	212.566	UNKWN	92.566
18	11	8	6	0	200.0	-0.465	-0.300	KNOWN	212.565	UNKWN	12.565
19	6	7	59	0	200.0	-0.009	-0.006	KNOWN	212.660	UNKWN	12.660
20	30	33	32	0	120.0	-0.023	-0.015	KNOWN	213.146	UNKWN	93.146
21	31	34	51	0	110.0	-0.023	-0.015	KNOWN	213.137	UNKWN	103.137
22	33	34	50	35	110.0	-0.023	-0.015	KNOWN	213.194	UNKWN	103.194
23	50	52	24	0	60.0	-0.023	-0.015	KNOWN	213.211	UNKWN	153.211
24	52	45	46	0	40.0	-0.047	-0.030	KNOWN	213.340	UNKWN	173.340
25	42	44	41	0	80.0	-0.023	-0.015	KNOWN	216.767	UNKWN	136.767
26	45	44	43	0	80.0	-0.047	-0.030	KNOWN	215.143	UNKWN	135.143
27	41	40	37	0	120.0	-0.023	-0.015	KNOWN	214.706	UNKWN	94.706
28	43	40	39	47	120.0	-0.023	-0.015	KNOWN	214.516	UNKWN	94.516
29	49	38	32	39	140.0	-0.009	-0.006	KNOWN	214.421	UNKWN	74.421
30	48	46	47	0	70.0	-0.139	-0.090	KNOWN	213.327	UNKWN	143.327
31	26	25	0	0	40.0	-0.023	-0.015	KNOWN	212.569	UNKWN	172.569
32	23	25	0	0	40.0	-0.023	-0.015	KNOWN	212.567	UNKWN	172.567
33	53	7	0	0	120.0	-0.023	-0.015	KNOWN	212.574	UNKWN	92.574
34	51	24	0	0	60.0	-0.023	-0.015	KNOWN	213.208	UNKWN	153.208
35	35	37	36	0	130.0	-0.023	-0.015	KNOWN	214.414	UNKWN	84.414
36	5	57	0	0	185.0	0.000	0.000	KNOWN	213.191	UNKWN	28.191
37	57	58	0	0	180.0	0.000	0.000	KNOWN	213.062	UNKWN	33.062
38	59	58	0	0	175.0	0.000	0.000	KNOWN	212.867	UNKWN	37.867
39	4	54	0	0	180.0	0.000	0.000	KNOWN	212.575	UNKWN	32.575
40	56	55	0	0	212.0	-1.674	-1.080	KNOWN	213.740	UNKWN	1.740
41	54	55	0	0	212.0	-1.671	-1.078	KNOWN	212.543	UNKWN	0.543

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FT	HAZEN' COEFF	RESISTANCE R=F(D,L,C)	STATUS RESIS'	- DISCHARGE - CFS	MGD
1	1	2	20.0	1750.0	65.0	0.303868	KNOWN	8.115	5.236
42	1	25	8.0	600.0	65.0	9.031610	KNOWN	1.386	0.894
2	2	4	12.0	200.0	65.0	0.417907	KNOWN	3.296	2.126
56	2	40	12.0	280.0	65.0	0.585070	KNOWN	3.145	2.029
3	4	3	12.0	380.0	65.0	0.794023	KNOWN	1.416	0.914
49	29	3	12.0	480.0	65.0	1.002976	KNOWN	1.058	0.683
48	30	3	16.0	750.0	65.0	0.386064	KNOWN	0.196	0.126
5	3	36	12.0	180.0	65.0	0.376116	KNOWN	0.531	0.343
38	4	29	12.0	210.0	65.0	0.438802	KNOWN	0.950	0.613
29	5	6	12.0	230.0	65.0	0.480593	KNOWN	0.266	0.171
30	20	5	12.0	850.0	65.0	1.776104	KNOWN	0.488	0.315
4	5	39	12.0	950.0	65.0	1.985058	KNOWN	0.199	0.129
28	6	7	12.0	320.0	65.0	0.668651	KNOWN	0.292	0.188
27	15	6	6.0	410.0	65.0	25.052403	KNOWN	0.049	0.032
22	7	8	24.0	270.0	65.0	0.019293	KNOWN	0.018	0.012
18	7	12	24.0	1200.0	65.0	0.085746	KNOWN	0.089	0.058
21	8	9	12.0	130.0	65.0	0.271639	KNOWN	0.042	0.027
23	32	8	16.0	1530.0	65.0	0.787570	KNOWN	0.024	0.015
19	9	10	12.0	700.0	65.0	1.462674	KNOWN	0.019	0.012
20	9	14	12.0	500.0	65.0	1.044767	KNOWN	0.023	0.015
15	11	10	12.0	450.0	65.0	0.940290	KNOWN	0.005	0.003
16	10	14	6.0	380.0	65.0	23.219300	KNOWN	0.000	0.000
14	12	11	12.0	180.0	65.0	0.376116	KNOWN	0.034	0.022
13	11	13	12.0	250.0	65.0	0.522384	KNOWN	0.004	0.003
11	12	18	24.0	680.0	65.0	0.048589	KNOWN	0.038	0.025
12	13	16	12.0	230.0	65.0	0.480593	KNOWN	0.005	0.003
9	17	13	12.0	780.0	65.0	1.629837	KNOWN	0.024	0.016
17	16	14	12.0	490.0	65.0	1.023872	KNOWN	0.001	0.001
31	21	15	8.0	1000.0	65.0	15.052683	KNOWN	0.143	0.092
26	15	31	6.0	360.0	65.0	21.997232	KNOWN	0.070	0.045
10	17	16	12.0	1200.0	65.0	2.507441	KNOWN	0.019	0.012
8	17	18	12.0	280.0	65.0	0.585070	KNOWN	0.033	0.021
53	33	17	12.0	290.0	65.0	0.605965	KNOWN	0.099	0.064
6	19	18	12.0	250.0	65.0	0.522384	KNOWN	0.400	0.258
7	19	33	8.0	280.0	65.0	4.214751	KNOWN	0.122	0.079
59	38	19	12.0	320.0	65.0	0.668651	KNOWN	0.531	0.343
33	22	20	12.0	250.0	65.0	0.522384	KNOWN	0.276	0.178
32	29	20	8.0	1230.0	65.0	18.514800	KNOWN	0.236	0.152
34	22	21	8.0	230.0	65.0	3.462117	KNOWN	0.109	0.070
51	34	21	8.0	950.0	65.0	14.300049	KNOWN	0.057	0.037
50	23	22	12.0	1000.0	65.0	2.089534	KNOWN	0.075	0.048
35	35	22	8.0	620.0	65.0	9.332664	KNOWN	0.333	0.215
52	24	23	12.0	1500.0	65.0	3.134301	KNOWN	0.178	0.115
24	23	34	12.0	200.0	65.0	0.417907	KNOWN	0.080	0.052
45	26	24	6.0	310.0	65.0	18.942061	KNOWN	0.281	0.181
46	24	30	12.0	1300.0	65.0	2.716395	KNOWN	0.056	0.036
44	25	26	8.0	150.0	65.0	2.257502	KNOWN	0.837	0.540
41	25	27	8.0	450.0	65.0	6.773707	KNOWN	0.526	0.339
43	26	28	10.0	430.0	65.0	2.183387	KNOWN	0.510	0.329
40	27	28	8.0	210.0	65.0	3.161063	KNOWN	0.219	0.141
37	27	35	8.0	200.0	65.0	3.010537	KNOWN	0.284	0.183
39	28	29	12.0	220.0	65.0	0.459698	KNOWN	0.426	0.275
47	28	30	8.0	840.0	65.0	12.644254	KNOWN	0.279	0.180
36	29	35	12.0	450.0	65.0	0.940290	KNOWN	0.073	0.047
25	31	32	12.0	320.0	65.0	0.668651	KNOWN	0.047	0.030
57	36	37	12.0	200.0	65.0	0.417907	KNOWN	0.531	0.343
58	37	38	12.0	300.0	65.0	0.626860	KNOWN	0.531	0.343
54	39	41	12.0	300.0	65.0	0.626860	KNOWN	0.199	0.129
55	40	41	12.0	280.0	65.0	0.585070	KNOWN	1.471	0.949

Boston Water

APPENDIX PH2

MEMORANDA

Charles A. Maguire & Associates

Boston Hartford Providence

Charles A. Maguire & Associates

Consulting Engineers

From: R. A. Barrows

INTER-OFFICE MEMORANDUM

To: Files

Job No.: 639.0

Subject: Boston Water System
Parker Hill Hospitals Meeting

Date: January 31, 1967

A meeting was held at the New England Baptist Hospital on January 31, 1967, with the following people in attendance:

New England Baptist Hospital	Robert B. Brigham Hospital	Charles A. Maguire & Associates
A. Rouse	J. Gleason	R. Barrows

1. New England Baptist Hospital

The existing system consists of three (3) 15 HP, 225 gpm pumps supplying two (2) 7,500 gal. tanks. Suction lines are 6" diameter supplied from Parker Hill Avenue at elev. 190 BCB. On a rotation basis, one (1) pump is in operation intermittently to fill the tanks. Two (2) pumps are required when the intake pressure drops to 10 psi or less. Minimum known low 6 psi during summer. During low pressures, considerable mud is sucked into tanks.

The hospital maintains a complete fire sprinkler system at 90 psi. The system is supplied from the three (3) 225 gpm pumps and is also connected to one (1) 225 gpm stand-by pump supplied from Fisher Avenue at elevation 186 with a 6" diameter suction line.

The hospital maintains a pressure at 60 psi for domestic purposes, and also supplies the cold water requirement to the nurses' quarters located on the corner of Fisher Avenue and Parker Hill Avenue. Hot water is drawn from Parker Hill Avenue directly. Total number of persons served daily is 240.

Presently there are 274 beds with plans in the next three (3) years for 500 beds with a permanent daily population at 600 and 1,000 persons respectively.

Top floor elevation of the present building is at elevation 248 BCB with future plans to increase height to elevation 269 BCB.

Future plans call for extension at nurses' quarters in conjunction with Robert B. Brigham Hosp., and a possible motel at the parking lot location on Parker Hill Avenue. This is anticipated within the next three (3) years.

Water consumption averages 124,000 gal/day, and is used primarily for domestic purposes. All new air conditioning is air cooled due to water problem. Total water per year is 5,219,000 cu. ft.

From: R. Barrows
To: Files
Re: Boston Water System

January 31, 1967
CAM #639.0

2. Robert B. Brigham Hospital

Does not have water problems due to intake located on Fisher Avenue at Estey Street, which is considerably lower than Parker Hill Avenue. Average pressure 35 psi with 6" suction line and 300 gpm pump. Hospital has a partial sprinkler system maintained at 90 psi with above pump and connected to stand by 500 gpm pump.

The present Hospital has 86 beds with future plans for 95 beds if acquisition by NEB Hospital does not go through. Present patients and staff number 150 persons. Elevation top of building 10 feet higher than NEB or elevation 258 BCB.

3. General Discussion

The highest apartment house has an elevation of 230 located approximately 300 ft. off the crest of the hill on Parker Hill Avenue. The three (3) story apartment across from NEB does not have water on top floors in the summer. Elevation approx. 230 also.

Future plans for the area call for, within the next year, the Lahey Clinic to construct new quarters on Fisher Avenue from Parker Hill Avenue to Estey Street. Project to be approximately Fourteen (14) Million Dollars, and have staff of 2,400 persons. Water will probably come from Heath Street at bottom of Parker Hill.

Possible razing of portion of RBB Hospital and expansion by NEB Hospital in the cleared locations.

Mr. Rouse does not expect pressures to eliminate pumping. However, feels adequate supply pressures for fire flows should be maintained. Suggested pumping station by City be constructed at bottom of hill, and is still occasionally in contact with the Mayor regarding this problem.

RAB/mfc

cc: K. P. Devenis
C. D. Howard
D. Haith

Charles A. Maguire & Associates

Consulting Engineers

From: R. Barrows

INTER-OFFICE MEMORANDUM

To: Files

Job No.: 639.0

Subject: Parker Hill

Date: March 6, 1967

An investigation of building elevations near the summit of Parker Hill revealed the following:

Parker Hill Avenue from Judge Street to Wait Street has eight (8) three story apartment buildings and three (3) two story homes ranging in top floor elevation from 185 feet to 225 feet. Floor areas of the top floors of various elevations are as follows:

Elevation (Feet)	Type of Structure	Floor Area (Feet)
185	3 story apartment	950
195	3 " "	850
200	3 " "	3,800
205	3 " "	950
210	2 " home	800
215	3 story apartment 2 " home	5,600
220	3 story apartment	800
225	3 " "	800

The above does not include the hospitals.

Other homes and apartments on the hill are well below critical elevations and were not considered. The attached plan indicates the buildings surveyed.

RAB:jf

cc: K. P. Devenis
R. Barrows
C. D. Howard
D. Haith

FORM 61-1

Boston Water

APPENDIX HPFS

COMPUTER ANALYSIS

Charles A. Maguire & Associates

Boston Hartford Providence

TABLE HPFS-1
STUDY DAY: 1966 OPERATION
150 PSI @ PUMPS; 125 PSI @
HYDRANTS NEAR NODE 62

NODE	CONNECTING PIPE NUMBERS	ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1 7 0 0	15.0	0.	0.	KNOWN	347.1		332.1
2	1 6 2 0	15.0	0.	0.	KNOWN	346.9		331.9
3	6 4 5 18	18.0	0.	0.	KNOWN	346.9		328.9
4	2 4 3 0	18.0	0.	0.	KNOWN	346.8		328.8
5	5 3 8 0	25.0	0.	0.	KNOWN	346.5		321.5
6	7 18 16 0	17.0	0.	0.	KNOWN	347.3		330.3
7	16 17 14 0	15.0	0.	0.	KNOWN	348.4		333.4
8	123 111 0 0	12.0	9.703	6.260		357.0	KNOWN	345.0
9	121 19 15 0	18.0	0.	0.	KNOWN	347.7		329.7
10	118 119 117 0	15.0	0.	0.	KNOWN	341.1		326.1
11	17 22 23 0	10.0	11.970	7.723		357.0	KNOWN	347.0
12	121 22 122 0	12.0	0.	0.	KNOWN	352.4		340.4
13	23 122 24 0	10.0	0.	0.	KNOWN	352.4		342.4
14	24 25 96 0	17.0	0.	0.	KNOWN	348.9		331.9
15	19 25 10 20	20.0	0.	0.	KNOWN	346.1		326.1
16	100 101 102 0	22.0	0.	0.	KNOWN	342.4		320.4
17	14 15 12 0	15.0	0.	0.	KNOWN	347.9		332.9
18	12 9 26 0	22.0	0.	0.	KNOWN	345.0		323.0
19	8 9 30 0	38.0	0.	0.	KNOWN	344.6		306.6
20	10 100 29 27	22.0	0.	0.	KNOWN	344.1		322.1
21	30 29 31 0	45.0	0.	0.	KNOWN	343.3		298.3
22	31 32 34 0	50.0	0.	0.	KNOWN	340.8		290.8
23	118 120 13 0	15.0	0.	0.	KNOWN	340.0		325.0
24	101 32 99 0	36.0	0.	0.	KNOWN	341.8		305.8
25	99 28 98 103	18.0	0.	0.	KNOWN	342.4		324.4
26	102 97 62 0	18.0	0.	0.	KNOWN	342.2		324.2
27	97 105 107 0	22.0	0.	0.	KNOWN	343.2		321.2
28	20 26 27 28	15.0	0.	0.	KNOWN	344.8		329.8
29	123 96 124 0	15.0	0.	0.	KNOWN	345.9		330.9
30	124 104 33 106	18.0	0.	0.	KNOWN	343.5		325.5
31	98 104 95 61	18.0	0.	0.	KNOWN	342.3		324.3
32	103 95 92 90	18.0	0.	0.	KNOWN	342.0		324.0
33	62 93 94 0	17.0	0.	0.	KNOWN	341.7		324.7
34	93 115 91 116	15.0	0.	0.	KNOWN	340.8		325.8
35	61 92 110 114	17.0	0.	0.	KNOWN	342.0		325.0
36	105 94 109 39	25.0	0.	0.	KNOWN	342.2		317.2
37	110 11 112 0	18.0	0.	0.	KNOWN	342.0		324.0
38	33 109 11 0	20.0	0.	0.	KNOWN	342.5		322.5
39	111 115 0 0	22.0	0.	0.	KNOWN	347.3		325.3
40	120 112 113 0	16.0	0.	0.	KNOWN	340.7		324.7
41	119 114 39 113	18.0	0.	0.	KNOWN	341.7		323.7
42	13 89 88 0	10.0	0.	0.	KNOWN	337.9		327.9
43	117 90 84 0	15.0	0.	0.	KNOWN	340.8		325.8
44	91 83 85 82	16.0	0.	0.	KNOWN	335.1		319.1
45	116 89 83 0	15.0	0.	0.	KNOWN	337.6		322.6
46	88 84 87 0	10.0	0.	0.	KNOWN	337.5		327.5
47	85 87 86 0	10.0	0.	0.	KNOWN	336.5		326.5
48	86 63 81 0	10.0	0.	0.	KNOWN	336.0		326.0
49	38 37 42 0	18.0	0.	0.	KNOWN	306.5		288.5
50	82 64 65 0	15.0	0.	0.	KNOWN	331.4		316.4
51	38 47 0 0	15.0	0.	0.	KNOWN	306.2		291.2
52	63 64 60 70	17.0	0.	0.	KNOWN	329.6		312.6
53	81 66 80 0	12.0	0.	0.	KNOWN	329.5		317.5
54	34 35 36 0	19.0	0.	0.	KNOWN	311.4		292.4
55	37 35 0 0	18.0	0.	0.	KNOWN	307.0		289.0
56	60 58 59 0	18.0	0.	0.	KNOWN	328.2		310.2
57	36 40 0 0	17.0	0.	0.	KNOWN	309.5		292.5
58	42 41 43 0	10.0	0.	0.	KNOWN	305.8		295.8
59	40 41 45 0	15.0	0.	0.	KNOWN	305.7		290.7
60	43 44 48 0	10.0	0.	0.	KNOWN	305.7		295.7
61	47 45 44 46	13.0	0.	0.	KNOWN	305.0		292.0
62	46 49 54 0	14.0	-21.073	-13.982		301.5	KNOWN	287.5
63	48 49 50 0	10.0	0.	0.	KNOWN	306.2		296.2
64	50 51 21 0	10.0	0.	0.	KNOWN	323.8		313.8
65	51 77 52 0	14.0	0.	0.	KNOWN	325.3		311.3
66	107 108 106 0	19.0	0.	0.	KNOWN	343.9		324.9
67	77 78 79 0	10.0	0.	0.	KNOWN	326.7		316.7
68	21 78 76 0	10.0	0.	0.	KNOWN	325.8		315.8
69	76 69 73 0	12.0	0.	0.	KNOWN	327.0		315.0
70	52 53 56 0	15.0	0.	0.	KNOWN	325.7		310.7
71	54 53 55 0	17.0	0.	0.	KNOWN	321.5		304.5
72	58 55 57 0	17.0	0.	0.	KNOWN	325.7		308.7
73	57 72 71 0	17.0	0.	0.	KNOWN	327.1		310.1
74	69 56 72 68	15.0	0.	0.	KNOWN	327.0		312.0
75	65 66 67 0	13.0	0.	0.	KNOWN	329.6		316.6
76	68 67 74 0	13.0	0.	0.	KNOWN	328.1		315.1
77	73 74 75 0	12.0	0.	0.	KNOWN	327.6		315.6
78	80 79 75 0	11.0	0.	0.	KNOWN	327.6		316.6
79	70 59 71 0	17.0	0.	0.	KNOWN	328.3		311.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	1	2	16.0	700.0	65.0	0.3603	KNOWN	0.601	0.388
7	6	1	16.0	1200.0	65.0	0.6177	KNOWN	0.601	0.388
6	2	3	12.0	800.0	65.0	1.6716	KNOWN	0.170	0.110
2	2	4	16.0	960.0	65.0	0.4942	KNOWN	0.432	0.278
4	3	4	16.0	710.0	65.0	0.3655	KNOWN	0.309	0.199
5	3	5	16.0	460.0	65.0	0.2368	KNOWN	1.265	0.816
18	6	3	16.0	460.0	65.0	0.2368	KNOWN	1.405	0.906
3	4	5	16.0	1100.0	65.0	0.5662	KNOWN	0.741	0.478
8	5	19	16.0	1020.0	65.0	0.5250	KNOWN	2.006	1.294
16	7	6	16.0	600.0	65.0	0.3089	KNOWN	2.006	1.294
17	11	7	16.0	900.0	65.0	0.4633	KNOWN	4.827	3.114
14	7	17	20.0	455.0	65.0	0.0790	KNOWN	2.821	1.820
123	8	29	12.0	320.0	65.0	0.6687	KNOWN	4.562	2.943
111	8	39	18.5	1860.0	65.0	0.4660	KNOWN	5.141	3.317
121	12	9	12.0	305.0	65.0	0.6373	KNOWN	2.925	1.887
19	9	15	20.0	610.0	65.0	0.1059	KNOWN	4.373	2.821
15	17	9	20.0	475.0	65.0	0.0825	KNOWN	1.448	0.934
118	10	23	12.0	710.0	65.0	1.4836	KNOWN	0.864	0.558
119	41	10	12.0	160.0	65.0	0.3343	KNOWN	1.338	0.863
117	10	43	12.0	500.0	65.0	1.0448	KNOWN	0.474	0.305
22	11	12	12.0	355.0	65.0	0.7418	KNOWN	2.680	1.729
23	11	13	16.0	555.0	65.0	0.2857	KNOWN	4.463	2.879
122	13	12	12.0	280.0	65.0	0.5851	KNOWN	0.245	0.158
24	13	14	16.0	480.0	65.0	0.2471	KNOWN	4.218	2.721
25	14	15	16.0	555.0	65.0	0.2857	KNOWN	3.411	2.201
96	14	29	12.0	2140.0	65.0	4.4716	KNOWN	0.807	0.520
10	15	20	16.0	1740.0	65.0	0.8957	KNOWN	1.547	0.998
20	15	28	20.0	250.0	65.0	0.0434	KNOWN	6.237	4.024
100	20	16	16.0	900.0	65.0	0.4633	KNOWN	1.997	1.288
101	16	24	12.0	530.0	65.0	1.1075	KNOWN	0.740	0.477
102	16	26	16.0	295.0	65.0	0.1519	KNOWN	1.258	0.811
12	17	18	12.0	775.0	65.0	1.6194	KNOWN	1.373	0.886
9	18	19	16.0	1155.0	42.0	1.3337	KNOWN	0.511	0.330
26	18	28	16.0	425.0	65.0	0.2188	KNOWN	0.862	0.556
30	19	21	16.0	470.0	65.0	0.2419	KNOWN	2.517	1.624
29	20	21	16.0	1000.0	65.0	0.5148	KNOWN	1.297	0.837
27	28	20	16.0	500.0	65.0	0.2574	KNOWN	1.746	1.127
31	21	22	16.0	400.0	65.0	0.2059	KNOWN	3.814	2.461
32	24	22	16.0	550.0	65.0	0.2831	KNOWN	1.964	1.267
34	22	54	16.0	2220.0	65.0	1.1427	KNOWN	5.778	3.728
120	40	23	20.0	230.0	65.0	0.0399	KNOWN	4.663	3.009
13	23	42	20.0	500.0	65.0	0.0868	KNOWN	5.528	3.566
99	25	24	16.0	780.0	65.0	0.4015	KNOWN	1.225	0.790
28	28	25	16.0	780.0	65.0	0.4015	KNOWN	2.649	1.709
98	25	31	16.0	440.0	65.0	0.2265	KNOWN	0.607	0.391
103	25	32	16.0	1015.0	65.0	0.5225	KNOWN	0.818	0.528
97	27	26	12.0	1120.0	65.0	2.3403	KNOWN	0.642	0.414
62	26	33	16.0	275.0	65.0	0.1416	KNOWN	1.899	1.225
105	27	36	12.0	780.0	65.0	1.6298	KNOWN	0.776	0.500
107	66	27	12.0	170.0	65.0	0.3552	KNOWN	1.418	0.915
108	28	66	18.0	500.0	65.0	0.1450	KNOWN	2.703	1.744
124	29	30	16.0	210.0	65.0	0.1081	KNOWN	5.368	3.464
104	30	31	12.0	650.0	65.0	1.3582	KNOWN	0.917	0.591
33	30	38	20.0	210.0	65.0	0.0365	KNOWN	5.737	3.701
106	66	30	16.0	560.0	65.0	0.2883	KNOWN	1.285	0.829
95	31	32	12.0	470.0	65.0	0.9821	KNOWN	0.499	0.322
61	31	35	16.0	575.0	65.0	0.2960	KNOWN	1.024	0.661
92	32	35	20.0	850.0	65.0	0.1476	KNOWN	0.486	0.313
90	32	43	12.0	800.0	65.0	1.6716	KNOWN	0.831	0.536
93	33	34	20.0	445.0	65.0	0.0773	KNOWN	3.921	2.530
94	36	33	20.0	745.0	65.0	0.1294	KNOWN	2.021	1.304
115	39	34	16.0	615.0	65.0	0.3166	KNOWN	5.141	3.317
91	34	44	12.0	1360.0	65.0	2.8418	KNOWN	1.449	0.935
116	34	45	20.0	425.0	65.0	0.0738	KNOWN	7.612	4.911
110	35	37	20.0	700.0	65.0	0.1215	KNOWN	0.302	0.195
114	35	41	16.0	430.0	65.0	0.2213	KNOWN	1.207	0.779
109	38	36	20.0	290.0	65.0	0.0504	KNOWN	2.673	1.724
39	36	41	16.0	545.0	65.0	0.2805	KNOWN	1.427	0.921
11	38	37	20.0	400.0	65.0	0.0695	KNOWN	3.064	1.977
112	37	40	20.0	800.0	65.0	0.1389	KNOWN	3.366	2.172
113	41	40	12.0	300.0	65.0	0.6269	KNOWN	1.297	0.837
89	42	45	12.0	650.0	65.0	1.3582	KNOWN	0.446	0.288
88	42	46	20.0	110.0	65.0	0.0191	KNOWN	5.081	3.278
84	43	46	12.0	970.0	65.0	2.0268	KNOWN	1.305	0.842
83	45	44	20.0	300.0	65.0	0.0521	KNOWN	8.059	5.199
85	47	44	12.0	670.0	65.0	1.4000	KNOWN	0.992	0.640
82	44	50	20.0	275.0	65.0	0.0478	KNOWN	10.500	6.774
87	46	47	20.0	190.0	65.0	0.0330	KNOWN	6.386	4.120
86	47	48	20.0	140.0	65.0	0.0243	KNOWN	5.395	3.480
63	48	52	12.0	1450.0	65.0	3.0298	KNOWN	1.489	0.961
81	48	53	16.0	1000.0	65.0	0.5148	KNOWN	3.905	2.519
38	49	51	16.0	600.0	65.0	0.3089	KNOWN	1.001	0.646
37	55	49	16.0	210.0	65.0	0.1081	KNOWN	2.324	1.499
42	49	58	16.0	770.0	65.0	0.3964	KNOWN	1.323	0.854
64	50	52	20.0	540.0	65.0	0.0938	KNOWN	4.921	3.175
65	50	75	20.0	425.0	65.0	0.0738	KNOWN	5.578	3.599
47	51	61	12.0	550.0	65.0	1.1492	KNOWN	1.001	0.646
60	52	56	16.0	500.0	65.0	0.2574	KNOWN	2.483	1.602
70	52	79	16.0	210.0	65.0	0.1081	KNOWN	3.929	2.535
66	75	53	20.0	360.0	65.0	0.0625	KNOWN	1.232	0.795
80	53	78	20.0	525.0	65.0	0.0912	KNOWN	5.137	3.315
35	54	55	12.0	440.0	65.0	0.9194	KNOWN	2.324	1.499
36	54	57	16.0	375.0	65.0	0.1930	KNOWN	3.454	2.229
58	56	72	16.0	690.0	65.0	0.3552	KNOWN	2.874	1.854
59	79	56	16.0	275.0	65.0	0.1416	KNOWN	0.391	0.252
40	57	59	16.0	730.0	65.0	0.3758	KNOWN	3.454	2.229
41	58	59	12.0	510.0	65.0	1.0657	KNOWN	0.257	0.166
43	58	60	16.0	190.0	65.0	0.0978	KNOWN	1.066	0.688
45	59	61	20.0	360.0	65.0	0.0625	KNOWN	3.711	2.394
44	60	61	16.0	330.0	65.0	0.1699	KNOWN	2.123	1.370
48	63	60	16.0	840.0	65.0	0.4324	KNOWN	1.057	0.682
46	61	62	20.0	580.0	65.0	0.1007	KNOWN	6.835	4.410
49	63	62	20.0	670.0	65.0	0.1163	KNOWN	7.372	4.756
54	71	62	16.0	940.0	65.0	0.4839	KNOWN	7.465	4.816
50	64	63	20.0	1960.0	65.0	0.3403	KNOWN	8.429	5.438
51	65	64	[illegible]	[illegible]	65.0	0.1528	KNOWN	3.367	2.172
21	68	64	20.0	[illegible]	65.0	0.0998	KNOWN	5.063	3.266
77	67	65	16.0	[illegible]	65.0	0.3552	KNOWN	2.124	1.370
52	70	65	17.9	950.0	65.0	0.2831	KNOWN	1.243	0.802
78	67	68	[illegible]	[illegible]	65.0	0.1285	KNOWN	2.805	1.810
79	78	67	[illegible]	[illegible]	65.0	0.0486	KNOWN	4.929	3.180
76	69	68	[illegible]	1475.0	65.0	0.2561	KNOWN	2.258	1.456
69	74	69	[illegible]	390.0	65.0	0.0677	KNOWN	0.386	0.249
73	77	69	16.0	350.0	65.0	0.1802	KNOWN	1.861	1.201
53	70	71	12.0	560.0	65.0	1.1701	KNOWN	1.990	1.284
56	74	70	16.0	290.0	65.0	0.1493	KNOWN	3.232	2.085
55	72	71	16.0	350.0	65.0	0.1802	KNOWN	5.475	3.532
57	73	72	16.0	450.0	65.0	0.2316	KNOWN	2.601	1.678
72	73	74	20.0	400.0	65.0	0.0695	KNOWN	0.936	0.604
71	79	73	16.0	220.0	65.0	0.1132	KNOWN	3.537	2.282
68	76	74	16.0	325.0	65.0	0.1673	KNOWN	2.693	1.737
67	75	76	16.0	200.0	65.0	0.1030	KNOWN	4.346	2.804
74	76	77	16.0	375.0	65.0	0.1930	KNOWN	1.653	1.067
75	78	77	12.0	650.0	65.0	1.3582	KNOWN	0.208	0.134

TABLE HPFS-2
MAXIMUM CAPACITY OF NETWORK
TO DELIVER HYDRANT DISCHARGE
@ 20 PSI NEAR NODE 62

NODE	CONNECTING PIPE NUMBERS	ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1 7 0 0	15.0	0.000	0.000	KNOWN	299.8		284.8
2	1 6 2 0	15.0	0.000	0.000	KNOWN	298.7		283.7
3	6 4 5 18	18.0	0.000	0.000	KNOWN	298.3		280.3
4	2 4 3 0	18.0	0.000	0.000	KNOWN	298.0		280.0
5	5 3 80 0	25.0	0.000	0.000	KNOWN	295.5		270.5
6	7 18 16 0	17.0	0.000	0.000	KNOWN	301.6		284.6
7	16 17 14 0	15.0	0.000	0.000	KNOWN	310.0		295.0
8	123 111 0 0	12.0	23.910	15.426		357.0	KNOWN	345.0
9	121 19 15 0	18.0	0.000	0.000	KNOWN	307.0		289.0
10	118 119 117 0	15.0	0.000	0.000	KNOWN	272.6		257.6
11	17 22 23 0	10.0	29.802	19.227		357.0	KNOWN	347.0
12	121 22 122 0	12.0	0.000	0.000	KNOWN	332.3		320.3
13	23 122 24 0	10.0	0.000	0.000	KNOWN	332.6		322.6
14	24 25 96 0	17.0	0.000	0.000	KNOWN	313.8		296.8
15	19 25 10 20	20.0	0.000	0.000	KNOWN	299.1		279.1
16	100 101 102 0	22.0	0.000	0.000	KNOWN	279.8		257.8
17	14 15 12 0	15.0	0.000	0.000	KNOWN	307.6		292.6
18	12 9 26 0	22.0	0.000	0.000	KNOWN	293.7		271.7
18	12 9 26 0	22.0	0.000	0.000	KNOWN	293.7		271.7
19	80 9 30 0	38.0	0.000	0.000	KNOWN	293.1		255.1
20	10 100 29 27	22.0	0.000	0.000	KNOWN	288.9		266.9
21	30 29 31 0	45.0	0.000	0.000	KNOWN	285.0		240.0
22	31 32 34 0	50.0	0.000	0.000	KNOWN	271.5		221.5
23	118 120 13 0	15.0	0.000	0.000	KNOWN	266.5		251.5
24	101 32 99 0	36.0	0.000	0.000	KNOWN	276.5		240.5
25	99 28 98 103	18.0	0.000	0.000	KNOWN	279.5		261.5
26	102 97 62 0	18.0	0.000	0.000	KNOWN	278.5		260.5
27	97 105 107 0	22.0	0.000	0.000	KNOWN	284.0		262.0
28	20 26 27 28	15.0	0.000	0.000	KNOWN	292.6		277.6
29	123 96 124 0	15.0	0.000	0.000	KNOWN	298.0		283.0
30	124 104 33 106	18.0	0.000	0.000	KNOWN	285.1		267.1
31	98 104 95 61	18.0	0.000	0.000	KNOWN	279.0		261.0
32	103 95 92 90	18.0	0.000	0.000	KNOWN	277.5		259.5
33	62 93 94 0	17.0	0.000	0.000	KNOWN	276.0		259.0
34	93 115 91 116	15.0	0.000	0.000	KNOWN	270.7		255.7
35	61 92 110 114	17.0	0.000	0.000	KNOWN	277.3		260.3
36	105 94 109 39	25.0	0.000	0.000	KNOWN	278.5		253.5
37	110 11 112 0	18.0	0.000	0.000	KNOWN	277.2		259.2
38	33 109 11 0	20.0	0.000	0.000	KNOWN	280.2		260.2
39	111 115 0 0	22.0	0.000	0.000	KNOWN	305.6		283.6
40	120 112 113 0	16.0	0.000	0.000	KNOWN	270.2		254.2
41	119 114 39 113	18.0	0.000	0.000	KNOWN	275.6		257.6
42	13 89 88 0	10.0	0.000	0.000	KNOWN	255.4		245.4
43	117 90 84 0	15.0	0.000	0.000	KNOWN	271.2		256.2
44	91 83 85 82	16.0	0.000	0.000	KNOWN	240.4		224.4
45	116 89 83 0	15.0	0.000	0.000	KNOWN	253.7		238.7
46	88 84 87 0	10.0	0.000	0.000	KNOWN	253.3		243.3
47	85 87 86 0	10.0	0.000	0.000	KNOWN	247.8		237.8
48	86 63 81 0	10.0	0.000	0.000	KNOWN	244.9		234.9
49	38 37 42 0	18.0	0.000	0.000	KNOWN	86.9		68.9
50	82 64 65 0	15.0	0.000	0.000	KNOWN	220.5		205.5
51	38 47 0 0	15.0	0.000	0.000	KNOWN	85.2		70.2
52	63 64 60 70	17.0	0.000	0.000	KNOWN	210.9		193.9
53	81 66 80 0	12.0	0.000	0.000	KNOWN	210.4		198.4
54	34 35 36 0	19.0	0.000	0.000	KNOWN	113.2		94.2
55	37 35 0 0	18.0	0.000	0.000	KNOWN	89.6		71.6
56	60 58 59 0	18.0	0.000	0.000	KNOWN	203.4		185.4
57	36 40 0 0	17.0	0.000	0.000	KNOWN	102.9		85.9
58	42 41 43 0	10.0	0.000	0.000	KNOWN	83.3		73.3
59	40 41 45 0	15.0	0.000	0.000	KNOWN	82.8		67.8
60	43 44 48 0	10.0	0.000	0.000	KNOWN	82.7		72.7
61	47 45 44 46	13.0	0.000	0.000	KNOWN	79.0		66.0
62	46 49 54 0	14.0	-53.712	-34.653		60.0	KNOWN	46.0
63	48 49 50 0	10.0	0.000	0.000	KNOWN	85.3		75.3
64	50 51 21 0	10.0	0.000	0.000	KNOWN	179.9		169.9
65	51 77 52 0	14.0	0.000	0.000	KNOWN	187.6		173.6
66	107 108 106 0	19.0	0.000	0.000	KNOWN	287.6		268.6
67	77 78 79 0	10.0	0.000	0.000	KNOWN	195.3		185.3
68	21 78 76 0	10.0	0.000	0.000	KNOWN	190.7		180.7
69	76 69 73 0	12.0	0.000	0.000	KNOWN	196.9		184.9
70	52 53 56 0	15.0	0.000	0.000	KNOWN	189.9		174.9
71	54 53 55 0	17.0	0.000	0.000	KNOWN	167.4		150.4
72	58 55 57 0	17.0	0.000	0.000	KNOWN	190.0		173.0
73	57 72 71 0	17.0	0.000	0.000	KNOWN	197.3		180.3
74	69 56 72 68	15.0	0.000	0.000	KNOWN	196.9		181.9
75	65 66 67 0	13.0	0.000	0.000	KNOWN	210.9		197.9
76	68 67 74 0	13.0	0.000	0.000	KNOWN	202.5		189.5
77	73 74 75 0	12.0	0.000	0.000	KNOWN	199.9		187.9
78	80 79 75 0	11.0	0.000	0.000	KNOWN	200.3		189.3
79	70 59 71 0	17.0	0.000	0.000	KNOWN	203.6		186.6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	1	2	16.0	700.0	65.0	0.3603	KNOWN	1.781	1.149
7	6	1	16.0	1200.0	65.0	0.6177	KNOWN	1.781	1.149
6	2	3	12.0	800.0	65.0	1.6716	KNOWN	0.503	0.324
2	2	4	16.0	960.0	65.0	0.4942	KNOWN	1.278	0.824
4	3	4	16.0	710.0	65.0	0.3655	KNOWN	0.915	0.590
5	3	5	16.0	460.0	65.0	0.2368	KNOWN	3.746	2.417
18	6	3	16.0	460.0	65.0	0.2368	KNOWN	4.158	2.683
3	4	5	16.0	1100.0	65.0	0.5662	KNOWN	2.192	1.414
80	5	19	20.0	525.0	65.0	0.0912	KNOWN	5.939	3.831
16	7	6	16.0	600.0	65.0	0.3089	KNOWN	5.939	3.831
17	11	7	16.0	900.0	65.0	0.4633	KNOWN	12.123	7.822
14	7	17	20.0	455.0	65.0	0.0790	KNOWN	6.185	3.990
123	8	29	12.0	320.0	65.0	0.6687	KNOWN	11.237	7.249
111	8	39	18.5	1860.0	65.0	0.4660	KNOWN	12.674	8.177
121	12	9	12.0	305.0	65.0	0.6373	KNOWN	7.301	4.710
19	9	15	20.0	610.0	65.0	0.1059	KNOWN	10.293	6.641
15	17	9	20.0	475.0	65.0	0.0825	KNOWN	2.992	1.931
118	10	23	12.0	710.0	65.0	1.4836	KNOWN	2.143	1.383
119	41	10	12.0	160.0	65.0	0.3343	KNOWN	3.315	2.139
117	10	43	12.0	500.0	65.0	1.0448	KNOWN	1.172	0.756
22	11	12	12.0	355.0	65.0	0.7418	KNOWN	6.636	4.281
23	11	13	16.0	555.0	65.0	0.2857	KNOWN	11.042	7.124
122	13	12	12.0	280.0	65.0	0.5851	KNOWN	0.665	0.429
24	13	14	16.0	480.0	65.0	0.2471	KNOWN	10.377	6.695
25	14	15	16.0	555.0	65.0	0.2857	KNOWN	8.401	5.420
96	14	29	12.0	2140.0	65.0	4.4716	KNOWN	1.976	1.275
10	15	20	16.0	1740.0	65.0	0.8957	KNOWN	3.721	2.401
20	15	28	20.0	250.0	65.0	0.0434	KNOWN	14.974	9.660
100	20	16	16.0	900.0	65.0	0.4633	KNOWN	4.976	3.210
101	16	24	12.0	530.0	65.0	1.1075	KNOWN	1.796	1.158
102	16	26	16.0	295.0	65.0	0.1519	KNOWN	3.180	2.052
12	17	18	12.0	775.0	65.0	1.6194	KNOWN	3.193	2.060
9	18	19	16.0	1155.0	42.0	1.3337	KNOWN	0.693	0.447
26	18	28	16.0	425.0	65.0	0.2188	KNOWN	2.499	1.612
30	19	21	16.0	470.0	65.0	0.2419	KNOWN	6.632	4.279
29	20	21	16.0	1000.0	65.0	0.5148	KNOWN	2.957	1.908
27	28	20	16.0	500.0	65.0	0.2574	KNOWN	4.212	2.718
31	21	22	16.0	400.0	65.0	0.2059	KNOWN	9.589	6.187
32	24	22	16.0	550.0	65.0	0.2831	KNOWN	4.745	3.061
34	22	54	16.0	2220.0	65.0	1.1427	KNOWN	14.335	9.248
120	40	23	20.0	230.0	65.0	0.0399	KNOWN	11.561	7.458
13	23	42	20.0	500.0	65.0	0.0868	KNOWN	13.704	8.841
99	25	24	16.0	780.0	65.0	0.4015	KNOWN	2.949	1.903
28	28	25	16.0	780.0	65.0	0.4015	KNOWN	6.546	4.225
98	25	31	16.0	440.0	65.0	0.2265	KNOWN	1.547	0.998
103	25	32	16.0	1015.0	65.0	0.5225	KNOWN	2.052	1.324
97	27	26	12.0	1120.0	65.0	2.3403	KNOWN	1.582	1.021
62	26	33	16.0	275.0	65.0	0.1416	KNOWN	4.763	3.073
105	27	36	12.0	780.0	65.0	1.6298	KNOWN	1.923	1.241
107	66	27	12.0	170.0	65.0	0.3552	KNOWN	3.506	2.262
108	28	66	18.0	500.0	65.0	0.1450	KNOWN	6.712	4.331
124	29	30	16.0	210.0	65.0	0.1081	KNOWN	13.212	8.524
104	30	31	12.0	650.0	65.0	1.3582	KNOWN	2.254	1.454
33	30	38	20.0	210.0	65.0	0.0365	KNOWN	14.165	9.139
106	66	30	16.0	560.0	65.0	0.2883	KNOWN	3.207	2.069
95	31	32	12.0	470.0	65.0	0.9821	KNOWN	1.243	0.802
61	31	35	16.0	575.0	65.0	0.2960	KNOWN	2.558	1.651
92	32	35	20.0	850.0	65.0	0.1476	KNOWN	1.231	0.794
90	32	43	12.0	800.0	65.0	1.6716	KNOWN	2.063	1.331
93	33	34	20.0	445.0	65.0	0.0773	KNOWN	9.765	6.300
94	36	33	20.0	745.0	65.0	0.1294	KNOWN	5.002	3.227
115	39	34	16.0	615.0	65.0	0.3166	KNOWN	12.674	8.177
91	34	44	12.0	1360.0	65.0	2.8418	KNOWN	3.589	2.316
116	34	45	20.0	425.0	65.0	0.0738	KNOWN	18.850	12.161
110	35	37	20.0	700.0	65.0	0.1215	KNOWN	0.787	0.508
114	35	41	16.0	430.0	65.0	0.2213	KNOWN	3.002	1.937
109	38	36	20.0	290.0	65.0	0.0504	KNOWN	6.607	4.262
39	36	41	16.0	545.0	65.0	0.2805	KNOWN	3.528	2.276
11	38	37	20.0	400.0	65.0	0.0695	KNOWN	7.559	4.877
112	37	40	20.0	800.0	65.0	0.1389	KNOWN	8.346	5.384
113	41	40	12.0	300.0	65.0	0.6269	KNOWN	3.215	2.074
89	42	45	12.0	650.0	65.0	1.3582	KNOWN	1.113	0.718
88	42	46	20.0	110.0	65.0	0.0191	KNOWN	12.590	8.123
84	43	46	12.0	970.0	65.0	2.0268	KNOWN	3.235	2.087
83	45	44	20.0	300.0	65.0	0.0521	KNOWN	19.963	12.879
85	47	44	12.0	670.0	65.0	1.4000	KNOWN	2.459	1.587
82	44	50	20.0	275.0	65.0	0.0478	KNOWN	26.011	16.781
87	46	47	20.0	190.0	65.0	0.0330	KNOWN	15.826	10.210
86	47	48	20.0	140.0	65.0	0.0243	KNOWN	13.367	8.624
63	48	52	12.0	1450.0	65.0	3.0298	KNOWN	3.691	2.381
81	48	53	16.0	1000.0	65.0	0.5148	KNOWN	9.676	6.242
38	49	51	16.0	600.0	65.0	0.3089	KNOWN	2.482	1.601
37	55	49	16.0	210.0	65.0	0.1081	KNOWN	5.765	3.719
42	49	58	16.0	770.0	65.0	0.3964	KNOWN	3.283	2.118
64	50	52	20.0	540.0	65.0	0.0938	KNOWN	12.192	7.866
65	50	75	20.0	425.0	65.0	0.0738	KNOWN	13.819	8.915
47	51	61	12.0	550.0	65.0	1.1492	KNOWN	2.482	1.601
60	52	56	16.0	500.0	65.0	0.2574	KNOWN	6.152	3.969
70	52	79	16.0	210.0	65.0	0.1081	KNOWN	9.731	6.278
66	75	53	20.0	360.0	65.0	0.0625	KNOWN	3.051	1.968
80	53	78	20.0	525.0	65.0	0.0912	KNOWN	12.727	8.211
35	54	55	12.0	440.0	65.0	0.9194	KNOWN	5.765	3.719
36	54	57	16.0	375.0	65.0	0.1930	KNOWN	8.569	5.529
58	56	72	16.0	690.0	65.0	0.3552	KNOWN	7.121	4.594
59	79	56	16.0	275.0	65.0	0.1416	KNOWN	0.970	0.626
40	57	59	16.0	730.0	65.0	0.3758	KNOWN	8.569	5.529
41	58	59	12.0	510.0	65.0	1.0657	KNOWN	0.634	0.409
43	58	60	16.0	190.0	65.0	0.0978	KNOWN	2.649	1.709
45	59	61	20.0	360.0	65.0	0.0625	KNOWN	9.204	5.938
44	60	61	16.0	330.0	65.0	0.1699	KNOWN	5.261	3.394
48	63	60	16.0	840.0	65.0	0.4324	KNOWN	2.612	1.685
46	61	62	20.0	580.0	65.0	0.1007	KNOWN	16.946	10.933
49	63	62	20.0	670.0	65.0	0.1163	KNOWN	18.270	11.787
54	71	62	16.0	940.0	65.0	0.4839	KNOWN	18.495	11.932
50	64	63	20.0	1960.0	65.0	0.3403	KNOWN	20.882	13.472
51	65	64	20.0	880.0	65.0	0.1528	KNOWN	8.340	5.381
21	68	64	20.0	575.0	65.0	0.0998	KNOWN	12.542	8.091
77	67	65	16.0	690.0	65.0	0.3552	KNOWN	5.262	3.395
52	70	65	17.9	950.0	65.0	0.2831	KNOWN	3.078	1.986
78	67	68	20.0	740.0	65.0	0.1285	KNOWN	6.949	4.484
79	78	67	20.0	280.0	65.0	0.0486	KNOWN	12.212	7.879
76	69	68	20.0	1475.0	65.0	0.2561	KNOWN	5.592	3.608
69	74	69	20.0	390.0	65.0	0.0677	KNOWN	0.980	0.632
73	77	69	16.0	350.0	65.0	0.1802	KNOWN	4.612	2.976
53	70	71	12.0	560.0	65.0	1.1701	KNOWN	4.931	3.181
56	74	70	16.0	290.0	65.0	0.1493	KNOWN	8.009	5.167
55	72	71	16.0	350.0	65.0	0.1802	KNOWN	13.565	8.751
57	73	72	16.0	450.0	65.0	0.2316	KNOWN	6.443	4.157
72	73	74	20.0	400.0	65.0	0.0695	KNOWN	2.316	1.494
71	79	73	16.0	220.0	65.0	0.1132	KNOWN	8.762	5.653
68	76	74	16.0	325.0	65.0	0.1673	KNOWN	6.670	4.303
67	75	76	16.0	200.0	65.0	0.1030	KNOWN	10.767	6.946
74	76	77	16.0	375.0	65.0	0.1930	KNOWN	4.097	2.643
75	78	77	12.0	650.0	65.0	1.3582	KNOWN	0.516	0.333

TABLE HPFS-3
STUDY DAY: 1966 OPERATION
35 PSI @ NODE 62

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	7	3	0	15.0	0.000	0.000	KNOWN	306.4		291.4
2	1	6	2	0	15.0	0.000	0.000	KNOWN	305.5		290.5
3	6	4	5	18	18.0	0.000	0.000	KNOWN	305.1		287.1
4	2	4	3	0	18.0	0.000	0.000	KNOWN	304.8		286.8
5	5	3	80	0	25.0	0.000	0.000	KNOWN	302.7		277.7
6	7	18	16	0	17.0	0.000	0.000	KNOWN	308.0		291.0
7	16	17	14	0	15.0	0.000	0.000	KNOWN	315.4		300.4
8	123	111	0	0	12.0	22.360	14.431		357.0	KNOWN	345.0
9	121	19	15	0	18.0	0.000	0.000	KNOWN	312.8		294.8
10	118	119	117	0	15.0	0.000	0.000	KNOWN	282.4		267.4
11	17	22	23	0	10.0	27.879	17.987		357.0	KNOWN	347.0
12	121	22	122	0	12.0	0.000	0.000	KNOWN	335.2		323.2
13	23	122	24	0	10.0	0.000	0.000	KNOWN	335.4		325.4
14	24	25	96	0	17.0	0.000	0.000	KNOWN	318.8		301.8
15	19	25	10	20	20.0	0.000	0.000	KNOWN	305.8		285.8
16	100	101	102	0	22.0	0.000	0.000	KNOWN	288.8		266.8
17	14	15	12	0	15.0	0.000	0.000	KNOWN	313.4		298.4
18	12	9	26	0	22.0	0.000	0.000	KNOWN	301.1		279.1
19	80	9	30	0	38.0	0.000	0.000	KNOWN	300.5		262.5
20	10	100	29	27	22.0	0.000	0.000	KNOWN	296.8		274.8
21	30	29	31	0	45.0	0.000	0.000	KNOWN	293.4		248.4
22	31	32	34	0	50.0	0.000	0.000	KNOWN	281.4		231.4
23	118	120	13	0	15.0	0.000	0.000	KNOWN	277.0		262.0
24	101	32	99	0	36.0	0.000	0.000	KNOWN	285.8		249.8
25	99	28	98	103	18.0	0.000	0.000	KNOWN	288.5		270.5
26	102	97	62	0	18.0	0.000	0.000	KNOWN	287.6		269.6
27	97	105	107	0	22.0	0.000	0.000	KNOWN	292.5		270.5
28	20	26	27	28	15.0	0.000	0.000	KNOWN	300.0		285.0
29	123	96	124	0	15.0	0.000	0.000	KNOWN	304.9		289.9
30	124	104	33	106	18.0	0.000	0.000	KNOWN	293.5		275.5
31	98	104	95	61	18.0	0.000	0.000	KNOWN	288.1		270.1
32	103	95	92	90	18.0	0.000	0.000	KNOWN	286.8		268.8
33	62	93	94	0	17.0	0.000	0.000	KNOWN	285.4		268.4
34	93	115	91	116	15.0	0.000	0.000	KNOWN	280.7		265.7
35	61	92	110	114	17.0	0.000	0.000	KNOWN	286.6		269.6
36	105	94	109	39	25.0	0.000	0.000	KNOWN	287.6		262.6
37	110	11	112	0	18.0	0.000	0.000	KNOWN	286.5		268.5
38	33	109	11	0	20.0	0.000	0.000	KNOWN	289.1		269.1
39	111	115	0	0	22.0	0.000	0.000	KNOWN	311.6		289.6
40	120	112	113	0	18.0	0.000	0.000	KNOWN	282.3		264.3
41	119	114	39	113	18.0	0.000	0.000	KNOWN	285.1		267.1
42	13	89	88	0	10.0	0.000	0.000	KNOWN	267.2		257.2
42	13	89	88	0	10.0	0.000	0.000	KNOWN	267.2		257.2
43	117	90	84	0	15.0	0.000	0.000	KNOWN	281.1		266.1
44	91	83	85	82	16.0	0.000	0.000	KNOWN	254.0		238.0
45	116	89	83	0	15.0	0.000	0.000	KNOWN	265.7		250.7
46	88	84	87	0	10.0	0.000	0.000	KNOWN	265.4		255.4
47	85	87	86	0	10.0	0.000	0.000	KNOWN	260.5		250.5
48	86	63	81	0	10.0	0.000	0.000	KNOWN	257.9		247.9
49	38	37	42	0	18.0	0.000	0.000	KNOWN	118.2		100.2
50	82	64	65	0	15.0	0.000	0.000	KNOWN	236.3		221.3
51	38	47	0	0	15.0	0.000	0.000	KNOWN	116.8		101.8
52	63	64	60	70	17.0	0.000	0.000	KNOWN	227.8		210.8
53	81	66	80	0	12.0	0.000	0.000	KNOWN	227.5		215.5
54	34	35	36	0	19.0	0.000	0.000	KNOWN	141.5		122.5
55	37	35	0	0	18.0	0.000	0.000	KNOWN	120.7		102.7
56	60	58	59	0	18.0	0.000	0.000	KNOWN	221.3		203.3
57	36	40	0	0	17.0	0.000	0.000	KNOWN	132.4		115.4
58	42	41	43	0	10.0	0.000	0.000	KNOWN	115.1		105.1
59	40	41	45	0	15.0	0.000	0.000	KNOWN	114.7		99.7
60	43	44	48	0	10.0	0.000	0.000	KNOWN	114.6		104.6
61	47	45	44	46	13.0	0.000	0.000	KNOWN	111.3		98.3
62	46	49	54	0	14.0	-50.247	-32.418		94.5	KNOWN	80.5
63	48	49	50	0	10.0	0.000	0.000	KNOWN	116.8		106.8
64	50	51	21	0	10.0	0.000	0.000	KNOWN	200.4		190.4
65	51	77	52	0	14.0	0.000	0.000	KNOWN	207.3		193.3
66	107	108	106	0	19.0	0.000	0.000	KNOWN	295.7		276.7
67	77	78	79	0	10.0	0.000	0.000	KNOWN	214.1		204.1
68	21	78	76	0	10.0	0.000	0.000	KNOWN	210.0		200.0
69	76	69	73	0	12.0	0.000	0.000	KNOWN	215.5		203.5
70	52	53	56	0	15.0	0.000	0.000	KNOWN	209.3		194.3
71	54	53	55	0	17.0	0.000	0.000	KNOWN	189.5		172.5
72	58	55	57	0	17.0	0.000	0.000	KNOWN	209.4		192.4
73	57	72	71	0	17.0	0.000	0.000	KNOWN	215.8		198.8
74	69	56	72	68	15.0	0.000	0.000	KNOWN	215.5		200.5
75	65	66	67	0	13.0	0.000	0.000	KNOWN	227.9		214.9
76	68	67	74	0	13.0	0.000	0.000	KNOWN	220.5		207.5
77	73	74	75	0	12.0	0.000	0.000	KNOWN	218.2		206.2
78	80	79	75	0	11.0	0.000	0.000	KNOWN	218.5		207.5
79	70	59	71	0	17.0	0.000	0.000	KNOWN	221.4		204.4

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	1	2	16.0	700.0	65.0	0.3603	KNOWN	1.666	1.075
7	6	1	16.0	1200.0	65.0	0.6177	KNOWN	1.666	1.075
6	2	3	12.0	800.0	65.0	1.6716	KNOWN	0.470	0.304
2	2	4	16.0	960.0	65.0	0.4942	KNOWN	1.195	0.771
4	3	4	16.0	710.0	65.0	0.3655	KNOWN	0.856	0.552
5	3	5	16.0	460.0	65.0	0.2368	KNOWN	3.505	2.261
18	6	3	16.0	460.0	65.0	0.2368	KNOWN	3.890	2.510
3	4	5	16.0	1100.0	65.0	0.5662	KNOWN	2.051	1.323
80	5	19	20.0	525.0	65.0	0.0912	KNOWN	5.556	3.584
16	7	6	16.0	600.0	65.0	0.3089	KNOWN	5.556	3.584
17	11	7	16.0	900.0	65.0	0.4633	KNOWN	11.341	7.317
14	7	17	20.0	455.0	65.0	0.0790	KNOWN	5.786	3.733
123	8	29	12.0	320.0	65.0	0.6687	KNOWN	10.512	6.782
111	8	39	18.5	1860.0	65.0	0.4060	KNOWN	11.856	7.649
121	12	9	12.0	305.0	65.0	0.6373	KNOWN	6.830	4.407
19	9	15	20.0	610.0	65.0	0.1059	KNOWN	9.629	6.213
15	17	9	20.0	475.0	65.0	0.0825	KNOWN	2.799	1.806
118	10	23	12.0	710.0	65.0	1.4836	KNOWN	2.005	1.293
119	41	10	12.0	160.0	65.0	0.3343	KNOWN	3.101	2.001
117	10	43	12.0	500.0	65.0	1.0448	KNOWN	1.097	0.707
22	11	12	12.0	355.0	65.0	0.7418	KNOWN	6.208	4.005
23	11	13	16.0	555.0	65.0	0.2857	KNOWN	10.330	6.664
122	13	12	12.0	280.0	65.0	0.5851	KNOWN	0.622	0.401
24	13	14	16.0	480.0	65.0	0.2471	KNOWN	9.708	6.263
25	14	15	16.0	555.0	65.0	0.2857	KNOWN	7.860	5.071
96	14	29	12.0	2140.0	65.0	4.4716	KNOWN	1.848	1.192
10	15	20	16.0	1740.0	65.0	0.8957	KNOWN	3.481	2.246
20	15	28	20.0	250.0	65.0	0.0434	KNOWN	14.008	9.037
100	20	16	16.0	900.0	65.0	0.4633	KNOWN	4.655	3.003
101	16	24	12.0	530.0	65.0	1.1075	KNOWN	1.680	1.084
102	16	26	16.0	295.0	65.0	0.1519	KNOWN	2.975	1.919
12	17	18	12.0	775.0	65.0	1.6194	KNOWN	2.987	1.927
9	18	19	16.0	1155.0	42.0	1.3337	KNOWN	0.649	0.419
26	18	28	16.0	425.0	65.0	0.2188	KNOWN	2.338	1.508
30	19	21	16.0	470.0	65.0	0.2419	KNOWN	6.204	4.003
29	20	21	16.0	1000.0	65.0	0.5148	KNOWN	2.767	1.785
27	28	20	16.0	500.0	65.0	0.2574	KNOWN	3.940	2.542
31	21	22	16.0	400.0	65.0	0.2059	KNOWN	8.971	5.788
32	24	22	16.0	550.0	65.0	0.2831	KNOWN	4.439	2.864
34	22	54	16.0	2220.0	65.0	1.1427	KNOWN	13.410	8.651
120	40	23	20.0	230.0	65.0	0.0399	KNOWN	10.815	6.977
13	23	42	20.0	500.0	65.0	0.0868	KNOWN	12.820	8.271
99	25	24	16.0	780.0	65.0	0.4015	KNOWN	2.759	1.780
28	28	25	16.0	780.0	65.0	0.4015	KNOWN	6.126	3.952
98	25	31	16.0	440.0	65.0	0.2265	KNOWN	1.447	0.934
103	25	32	16.0	1015.0	65.0	0.5225	KNOWN	1.919	1.238
97	27	26	12.0	1120.0	65.0	2.3403	KNOWN	1.480	0.955
62	26	33	16.0	275.0	65.0	0.1416	KNOWN	4.455	2.874
105	27	36	12.0	780.0	65.0	1.6298	KNOWN	1.799	1.161
107	66	27	12.0	170.0	65.0	0.3552	KNOWN	3.279	2.116
108	28	66	18.0	500.0	65.0	0.1450	KNOWN	6.280	4.051
124	29	30	16.0	210.0	65.0	0.1081	KNOWN	12.360	7.974
104	30	31	12.0	650.0	65.0	1.3582	KNOWN	2.109	1.360
33	30	38	20.0	210.0	65.0	0.0365	KNOWN	13.252	8.549
106	66	30	16.0	560.0	65.0	0.2883	KNOWN	3.000	1.936
95	31	32	12.0	470.0	65.0	0.9821	KNOWN	1.163	0.750
61	31	35	16.0	575.0	65.0	0.2960	KNOWN	2.393	1.544
92	32	35	20.0	850.0	65.0	0.1476	KNOWN	1.152	0.743
90	32	43	12.0	800.0	65.0	1.6716	KNOWN	1.930	1.245
93	33	34	20.0	445.0	65.0	0.0773	KNOWN	9.135	5.894
94	36	33	20.0	745.0	65.0	0.1294	KNOWN	4.680	3.019
115	39	34	16.0	615.0	65.0	0.3166	KNOWN	11.856	7.649
91	34	44	12.0	1360.0	65.0	2.8418	KNOWN	3.358	2.166
116	34	45	20.0	425.0	65.0	0.0738	KNOWN	17.634	11.377
110	35	37	20.0	700.0	65.0	0.1215	KNOWN	0.737	0.475
114	35	41	16.0	430.0	65.0	0.2213	KNOWN	2.809	1.812
109	38	36	20.0	290.0	65.0	0.0504	KNOWN	6.181	3.988
39	36	41	16.0	545.0	65.0	0.2805	KNOWN	3.300	2.129
11	38	37	20.0	400.0	65.0	0.0695	KNOWN	7.071	4.562
112	37	40	20.0	800.0	65.0	0.1389	KNOWN	7.808	5.037
113	41	40	12.0	300.0	65.0	0.6269	KNOWN	3.087	1.948
89	42	45	12.0	650.0	65.0	1.3582	KNOWN	1.041	0.672
88	42	46	20.0	110.0	65.0	0.0191	KNOWN	11.778	7.599
84	43	46	12.0	970.0	65.0	2.0268	KNOWN	3.027	1.953
83	45	44	20.0	300.0	65.0	0.0521	KNOWN	18.675	12.048
85	47	44	12.0	670.0	65.0	1.4000	KNOWN	2.301	1.484
82	44	50	20.0	275.0	65.0	0.0478	KNOWN	24.333	15.699
87	46	47	20.0	190.0	65.0	0.0330	KNOWN	14.805	9.552
86	47	48	20.0	140.0	65.0	0.0243	KNOWN	12.504	8.067
63	48	52	12.0	1450.0	65.0	3.0298	KNOWN	3.453	2.227
81	48	53	16.0	1000.0	65.0	0.5148	KNOWN	9.052	5.840
38	49	51	16.0	600.0	65.0	0.3089	KNOWN	2.322	1.498
37	55	49	16.0	210.0	65.0	0.1081	KNOWN	5.393	3.479
42	49	58	16.0	770.0	65.0	0.3964	KNOWN	3.071	1.981
64	50	52	20.0	540.0	65.0	0.0938	KNOWN	11.406	7.359
65	50	75	20.0	425.0	65.0	0.0738	KNOWN	12.927	8.340
47	51	61	12.0	550.0	65.0	1.1492	KNOWN	2.322	1.498
60	52	56	16.0	500.0	65.0	0.2574	KNOWN	5.755	3.713
70	52	79	16.0	210.0	65.0	0.1081	KNOWN	9.104	5.873
66	75	53	20.0	360.0	65.0	0.0625	KNOWN	2.855	1.842
80	53	78	20.0	525.0	65.0	0.0912	KNOWN	11.906	7.682
35	54	55	12.0	440.0	65.0	0.9194	KNOWN	5.393	3.479
36	54	57	16.0	375.0	65.0	0.1930	KNOWN	8.017	5.172
58	56	72	16.0	690.0	65.0	0.3552	KNOWN	6.662	4.298
59	79	56	16.0	275.0	65.0	0.1416	KNOWN	0.907	0.585
40	57	59	16.0	730.0	65.0	0.3758	KNOWN	8.017	5.172
41	58	59	12.0	510.0	65.0	1.0657	KNOWN	0.593	0.383
43	58	60	16.0	190.0	65.0	0.0978	KNOWN	2.477	1.598
45	59	61	20.0	360.0	65.0	0.0625	KNOWN	8.610	5.555
44	60	61	16.0	330.0	65.0	0.1699	KNOWN	4.922	3.175
48	63	60	16.0	840.0	65.0	0.4324	KNOWN	2.441	1.575
46	61	62	20.0	580.0	65.0	0.1007	KNOWN	15.854	10.228
49	63	62	20.0	670.0	65.0	0.1163	KNOWN	17.091	11.026
54	71	62	16.0	940.0	65.0	0.4839	KNOWN	17.302	11.163
50	64	63	20.0	1960.0	65.0	0.3403	KNOWN	19.535	12.603
51	65	64	20.0	880.0	65.0	0.1528	KNOWN	7.802	5.034
21	68	64	20.0	575.0	65.0	0.0998	KNOWN	11.733	7.570
77	67	65	16.0	690.0	65.0	0.3552	KNOWN	4.923	3.176
52	70	65	16.0	950.0	65.0	0.2831	KNOWN	2.880	1.858
78	67	68	20.0	740.0	65.0	0.1285	KNOWN	6.501	4.194
79	78	67	20.0	280.0	65.0	0.0486	KNOWN	11.424	7.370
76	69	68	20.0	1475.0	65.0	0.2561	KNOWN	5.232	3.375
69	74	69	20.0	390.0	65.0	0.0677	KNOWN	0.917	0.591
73	77	69	16.0	350.0	65.0	0.1802	KNOWN	4.315	2.784
53	70	71	12.0	560.0	65.0	1.1701	KNOWN	4.613	2.976
56	74	70	16.0	290.0	65.0	0.1493	KNOWN	7.492	4.834
55	72	71	16.0	350.0	65.0	0.1802	KNOWN	12.690	8.187
57	73	72	16.0	450.0	65.0	0.2316	KNOWN	6.028	3.889
72	73	74	20.0	400.0	65.0	0.0695	KNOWN	2.169	1.399
71	79	73	16.0	220.0	65.0	0.1132	KNOWN	8.196	5.288
68	76	74	16.0	325.0	65.0	0.1673	KNOWN	6.240	4.026
67	75	76	16.0	200.0	65.0	0.1030	KNOWN	10.073	6.498
74	76	77	16.0	375.0	65.0	0.1930	KNOWN	3.832	2.473
75	78	77	12.0	650.0	65.0	1.3582	KNOWN	0.482	0.311

TABLE HPFS-4
STUDY DAY: 1966 OPERATION
122 PSI @ NODE 62

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	7	0	0	15.0	0.000	0.000	KNOWN	345.1		330.1
2	1	6	2	0	15.0	0.000	0.000	KNOWN	344.8		329.8
3	6	4	5	18	18.0	0.000	0.000	KNOWN	344.7		326.7
4	2	4	3	0	18.0	0.000	0.000	KNOWN	344.7		326.7
5	5	3	80	0	25.0	0.000	0.000	KNOWN	344.2		319.2
6	7	18	16	0	17.0	0.000	0.000	KNOWN	345.4		328.4
7	16	17	14	0	15.0	0.000	0.000	KNOWN	347.2		332.2
8	123	111	0	0	12.0	10.261	6.620		357.0	KNOWN	345.0
9	121	19	15	0	18.0	0.000	0.000	KNOWN	346.6		328.6
10	118	119	117	0	15.0	0.000	0.000	KNOWN	339.4		324.4
11	17	22	23	0	10.0	12.789	8.251		357.0	KNOWN	347.0
12	121	22	122	0	12.0	0.000	0.000	KNOWN	351.8		339.8
13	23	122	24	0	10.0	0.000	0.000	KNOWN	351.9		341.9
14	24	25	96	0	17.0	0.000	0.000	KNOWN	348.0		331.0
15	19	25	10	20	20.0	0.000	0.000	KNOWN	344.9		324.9
16	100	101	102	0	22.0	0.000	0.000	KNOWN	340.9		318.9
17	14	15	12	0	15.0	0.000	0.000	KNOWN	346.7		331.7
18	12	9	26	0	22.0	0.000	0.000	KNOWN	343.8		321.8
19	80	9	30	0	38.0	0.000	0.000	KNOWN	343.7		305.7
20	10	100	29	27	22.0	0.000	0.000	KNOWN	342.8		320.8
21	30	29	31	0	45.0	0.000	0.000	KNOWN	342.0		297.0
22	31	32	34	0	50.0	0.000	0.000	KNOWN	339.1		289.1
23	118	120	13	0	15.0	0.000	0.000	KNOWN	338.1		323.1
24	101	32	99	0	36.0	0.000	0.000	KNOWN	340.2		304.2
25	99	28	98	103	18.0	0.000	0.000	KNOWN	340.8		322.8
26	102	97	62	0	18.0	0.000	0.000	KNOWN	340.6		322.6
27	97	105	107	0	22.0	0.000	0.000	KNOWN	341.8		319.8
28	20	26	27	28	15.0	0.000	0.000	KNOWN	343.5		328.5
29	123	96	124	0	15.0	0.000	0.000	KNOWN	344.7		329.7
30	124	104	33	106	18.0	0.000	0.000	KNOWN	342.0		324.0
31	98	104	95	61	18.0	0.000	0.000	KNOWN	340.7		322.7
32	103	95	92	90	18.0	0.000	0.000	KNOWN	340.4		322.4
33	62	93	94	0	17.0	0.000	0.000	KNOWN	340.1		323.1
34	93	115	91	116	15.0	0.000	0.000	KNOWN	339.0		324.0
35	61	92	110	114	17.0	0.000	0.000	KNOWN	340.4		323.4
36	105	94	109	39	25.0	0.000	0.000	KNOWN	340.6		315.6
37	110	11	112	0	18.0	0.000	0.000	KNOWN	340.4		322.4
38	33	109	11	0	20.0	0.000	0.000	KNOWN	341.0		321.0
39	111	115	0	0	22.0	0.000	0.000	KNOWN	346.3		324.3
40	120	112	113	0	18.0	0.000	0.000	KNOWN	340.9		322.9
41	119	114	39	113	18.0	0.000	0.000	KNOWN	340.0		322.0
42	13	89	88	0	10.0	0.000	0.000	KNOWN	335.8		325.8
43	117	90	84	0	15.0	0.000	0.000	KNOWN	339.1		324.1
44	91	83	85	82	16.0	0.000	0.000	KNOWN	332.7		316.7
45	116	89	83	0	15.0	0.000	0.000	KNOWN	335.4		320.4
46	88	84	87	0	10.0	0.000	0.000	KNOWN	335.4		325.4
47	85	87	86	0	10.0	0.000	0.000	KNOWN	334.2		324.2
48	86	63	81	0	10.0	0.000	0.000	KNOWN	333.6		323.6
49	38	37	42	0	18.0	0.000	0.000	KNOWN	300.6		282.6
50	82	64	65	0	15.0	0.000	0.000	KNOWN	328.5		313.5
51	38	47	0	0	15.0	0.000	0.000	KNOWN	300.3		285.3
52	63	64	60	70	17.0	0.000	0.000	KNOWN	326.5		309.5
53	81	66	80	0	12.0	0.000	0.000	KNOWN	326.4		314.4
54	34	35	36	0	19.0	0.000	0.000	KNOWN	306.1		287.1
55	37	35	0	0	18.0	0.000	0.000	KNOWN	301.2		283.2
56	60	58	59	0	18.0	0.000	0.000	KNOWN	324.9		306.9
57	36	40	0	0	17.0	0.000	0.000	KNOWN	304.0		287.0
58	42	41	43	0	10.0	0.000	0.000	KNOWN	299.9		289.9
59	40	41	45	0	15.0	0.000	0.000	KNOWN	299.8		284.8
60	43	44	48	0	10.0	0.000	0.000	KNOWN	299.7		289.7
61	47	45	44	46	13.0	0.000	0.000	KNOWN	299.0		286.0
62	46	49	54	0	14.0	-23.050	-14.871		295.0	KNOWN	281.0
63	48	49	50	0	10.0	0.000	0.000	KNOWN	300.3		290.3
64	50	51	21	0	10.0	0.000	0.000	KNOWN	320.0		310.0
65	51	77	52	0	14.0	0.000	0.000	KNOWN	321.6		307.6
66	107	108	106	0	19.0	0.000	0.000	KNOWN	342.5		323.5
67	77	78	79	0	10.0	0.000	0.000	KNOWN	323.2		313.2
68	21	78	76	0	10.0	0.000	0.000	KNOWN	322.3		312.3
69	76	69	73	0	12.0	0.000	0.000	KNOWN	323.6		311.6
70	52	53	56	0	15.0	0.000	0.000	KNOWN	322.1		307.1
71	54	53	55	0	17.0	0.000	0.000	KNOWN	317.4		300.4
72	58	55	57	0	17.0	0.000	0.000	KNOWN	322.1		305.1
73	57	72	71	0	17.0	0.000	0.000	KNOWN	323.7		306.7
74	69	56	72	68	15.0	0.000	0.000	KNOWN	323.6		308.6
75	65	66	67	0	13.0	0.000	0.000	KNOWN	326.5		313.5
76	68	67	74	0	13.0	0.000	0.000	KNOWN	324.8		311.8
77	73	74	75	0	12.0	0.000	0.000	KNOWN	324.2		312.2
78	80	79	75	0	11.0	0.000	0.000	KNOWN	324.3		313.3
79	70	59	71	0	17.0	0.000	0.000	KNOWN	325.0		308.0

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	1	2	16.0	700.0	65.0	0.3603	KNOWN	0.764	0.493
7	6	1	16.0	1200.0	65.0	0.6177	KNOWN	0.764	0.493
6	2	3	12.0	800.0	65.0	1.6716	KNOWN	0.216	0.139
2	2	4	16.0	960.0	65.0	0.4942	KNOWN	0.548	0.354
4	3	4	16.0	710.0	65.0	0.3655	KNOWN	0.393	0.253
5	3	5	16.0	460.0	65.0	0.2368	KNOWN	1.608	1.037
18	6	3	16.0	460.0	65.0	0.2368	KNOWN	1.784	1.151
3	4	5	16.0	1100.0	65.0	0.5662	KNOWN	0.941	0.607
80	5	19	20.0	525.0	65.0	0.0912	KNOWN	2.548	1.644
16	7	6	16.0	600.0	65.0	0.3089	KNOWN	2.548	1.644
17	11	7	16.0	900.0	65.0	0.4633	KNOWN	5.203	3.357
14	7	17	20.0	455.0	65.0	0.0790	KNOWN	2.654	1.712
123	8	29	12.0	320.0	65.0	0.6687	KNOWN	4.822	3.111
111	8	39	18.5	1860.0	65.0	0.4060	KNOWN	5.439	3.509
121	12	9	12.0	305.0	65.0	0.6373	KNOWN	3.133	2.021
19	9	15	20.0	610.0	65.0	0.1059	KNOWN	4.417	2.850
15	17	9	20.0	475.0	65.0	0.0825	KNOWN	1.284	0.828
118	10	23	12.0	710.0	65.0	1.4836	KNOWN	0.920	0.593
119	41	10	12.0	160.0	65.0	0.3343	KNOWN	1.423	0.918
117	10	43	12.0	500.0	65.0	1.0448	KNOWN	0.503	0.325
22	11	12	12.0	355.0	65.0	0.7418	KNOWN	2.848	1.837
23	11	13	16.0	555.0	65.0	0.2857	KNOWN	4.739	3.057
122	13	12	12.0	280.0	65.0	0.5851	KNOWN	0.285	0.184
24	13	14	16.0	480.0	65.0	0.2471	KNOWN	4.453	2.873
25	14	15	16.0	555.0	65.0	0.2857	KNOWN	3.605	2.326
96	14	29	12.0	2140.0	65.0	4.4716	KNOWN	0.848	0.547
10	15	20	16.0	1740.0	65.0	0.8957	KNOWN	1.597	1.030
20	15	28	20.0	250.0	65.0	0.0434	KNOWN	6.426	4.146
100	20	16	16.0	900.0	65.0	0.4633	KNOWN	2.135	1.378
101	16	24	12.0	530.0	65.0	1.1075	KNOWN	0.771	0.497
102	16	26	16.0	295.0	65.0	0.1519	KNOWN	1.365	0.880
12	17	18	12.0	775.0	65.0	1.6194	KNOWN	1.370	0.884
9	18	19	16.0	1155.0	42.0	1.3337	KNOWN	0.298	0.192
26	18	28	16.0	425.0	65.0	0.2188	KNOWN	1.072	0.692
30	19	21	16.0	470.0	65.0	0.2419	KNOWN	2.846	1.836
29	20	21	16.0	1000.0	65.0	0.5148	KNOWN	1.269	0.819
27	28	20	16.0	500.0	65.0	0.2574	KNOWN	1.808	1.166
31	21	22	16.0	400.0	65.0	0.2059	KNOWN	4.115	2.655
32	24	22	16.0	550.0	65.0	0.2831	KNOWN	2.036	1.314
34	22	54	16.0	2220.0	65.0	1.1427	KNOWN	6.152	3.969
120	40	23	20.0	230.0	65.0	0.0399	KNOWN	4.961	3.201
13	23	42	20.0	500.0	65.0	0.0868	KNOWN	5.881	3.794
99	25	24	16.0	780.0	65.0	0.4015	KNOWN	1.266	0.817
28	28	25	16.0	780.0	65.0	0.4015	KNOWN	2.810	1.813
98	25	31	16.0	440.0	65.0	0.2265	KNOWN	0.664	0.428
103	25	32	16.0	1015.0	65.0	0.5225	KNOWN	0.880	0.568
97	27	26	12.0	1120.0	65.0	2.3403	KNOWN	0.679	0.438
62	26	33	16.0	275.0	65.0	0.1416	KNOWN	2.044	1.319
105	27	36	12.0	780.0	65.0	1.6298	KNOWN	0.825	0.532
107	66	27	12.0	170.0	65.0	0.3552	KNOWN	1.504	0.971
108	28	66	18.0	500.0	65.0	0.1450	KNOWN	2.881	1.858
124	29	30	16.0	210.0	65.0	0.1081	KNOWN	5.670	3.658
104	30	31	12.0	650.0	65.0	1.3582	KNOWN	0.967	0.624
33	30	38	20.0	210.0	65.0	0.0365	KNOWN	6.079	3.922
106	66	30	16.0	560.0	65.0	0.2883	KNOWN	1.376	0.888
95	31	32	12.0	470.0	65.0	0.9821	KNOWN	0.533	0.344
61	31	35	16.0	575.0	65.0	0.2960	KNOWN	1.098	0.708
92	32	35	20.0	850.0	65.0	0.1476	KNOWN	0.528	0.341
90	32	43	12.0	800.0	65.0	1.6716	KNOWN	0.885	0.571
93	33	34	20.0	445.0	65.0	0.0773	KNOWN	4.191	2.704
94	36	33	20.0	745.0	65.0	0.1294	KNOWN	2.147	1.385
115	39	34	16.0	615.0	65.0	0.3166	KNOWN	5.439	3.509
91	34	44	12.0	1360.0	65.0	2.8418	KNOWN	1.540	0.994
116	34	45	20.0	425.0	65.0	0.0738	KNOWN	8.089	5.219
110	35	37	20.0	700.0	65.0	0.1215	KNOWN	0.338	0.218
114	35	41	16.0	430.0	65.0	0.2213	KNOWN	1.288	0.831
109	38	36	20.0	290.0	65.0	0.0504	KNOWN	2.835	1.829
39	36	41	16.0	545.0	65.0	0.2805	KNOWN	1.514	0.977
11	38	37	20.0	400.0	65.0	0.0695	KNOWN	3.244	2.093
112	37	40	20.0	800.0	65.0	0.1389	KNOWN	3.582	2.311
113	41	40	12.0	300.0	65.0	0.6269	KNOWN	1.380	0.890
89	42	45	12.0	650.0	65.0	1.3582	KNOWN	0.478	0.308
88	42	46	20.0	110.0	65.0	0.0191	KNOWN	5.403	3.486
84	43	46	12.0	970.0	65.0	2.0268	KNOWN	1.386	0.894
83	45	44	20.0	300.0	65.0	0.0521	KNOWN	8.567	5.527
85	47	44	12.0	670.0	65.0	1.4000	KNOWN	1.055	0.681
82	44	50	20.0	275.0	65.0	0.0478	KNOWN	11.162	7.202
87	46	47	20.0	190.0	65.0	0.0330	KNOWN	6.792	4.382
86	47	48	20.0	140.0	65.0	0.0243	KNOWN	5.736	3.701
63	48	52	12.0	1450.0	65.0	3.0298	KNOWN	1.584	1.022
81	48	53	16.0	1000.0	65.0	0.5148	KNOWN	4.152	2.679
38	49	51	16.0	600.0	65.0	0.3089	KNOWN	1.065	0.687
37	55	49	16.0	210.0	65.0	0.1081	KNOWN	2.474	1.596
42	49	58	16.0	770.0	65.0	0.3964	KNOWN	1.409	0.909
64	50	52	20.0	540.0	65.0	0.0938	KNOWN	5.233	3.376
65	50	75	20.0	425.0	65.0	0.0738	KNOWN	5.930	3.826
47	51	61	12.0	550.0	65.0	1.1492	KNOWN	1.065	0.687
60	52	56	16.0	500.0	65.0	0.2574	KNOWN	2.640	1.703
70	52	79	16.0	210.0	65.0	0.1081	KNOWN	4.176	2.694
66	75	53	20.0	360.0	65.0	0.0625	KNOWN	1.309	0.844
80	53	78	20.0	525.0	65.0	0.0912	KNOWN	5.462	3.524
35	54	55	12.0	440.0	65.0	0.9194	KNOWN	2.474	1.596
36	54	57	16.0	375.0	65.0	0.1930	KNOWN	3.678	2.373
58	56	72	16.0	690.0	65.0	0.3552	KNOWN	3.056	1.972
59	79	56	16.0	275.0	65.0	0.1416	KNOWN	0.416	0.268
40	57	59	16.0	730.0	65.0	0.3758	KNOWN	3.678	2.373
41	58	59	12.0	510.0	65.0	1.0657	KNOWN	0.272	0.176
43	58	60	16.0	190.0	65.0	0.0978	KNOWN	1.137	0.733
45	59	61	20.0	360.0	65.0	0.0625	KNOWN	3.950	2.548
44	60	61	16.0	330.0	65.0	0.1699	KNOWN	2.258	1.456
48	63	60	16.0	840.0	65.0	0.4324	KNOWN	1.121	0.723
46	61	62	20.0	580.0	65.0	0.1007	KNOWN	7.272	4.692
49	63	62	20.0	670.0	65.0	0.1163	KNOWN	7.841	5.059
54	71	62	16.0	940.0	65.0	0.4839	KNOWN	7.937	5.121
50	64	63	20.0	1960.0	65.0	0.3403	KNOWN	8.961	5.782
51	65	64	20.0	880.0	65.0	0.1528	KNOWN	3.579	2.309
21	68	64	20.0	575.0	65.0	0.0998	KNOWN	5.382	3.473
77	67	65	16.0	690.0	65.0	0.3552	KNOWN	2.258	1.457
52	70	65	16.0	950.0	65.0	0.2031	KNOWN	1.321	0.853
78	67	68	20.0	740.0	65.0	0.1285	KNOWN	2.962	1.924
79	78	67	20.0	280.0	65.0	0.0486	KNOWN	5.241	3.381
76	69	68	20.0	1475.0	65.0	0.2561	KNOWN	2.400	1.549
69	74	69	20.0	390.0	65.0	0.0677	KNOWN	0.398	0.257
73	77	69	16.0	350.0	65.0	0.1802	KNOWN	1.979	1.276
53	70	71	12.0	560.0	65.0	1.1701	KNOWN	2.116	1.365
56	74	70	16.0	290.0	65.0	0.1493	KNOWN	3.436	2.217
55	72	71	16.0	350.0	65.0	0.1802	KNOWN	5.821	3.756
57	73	72	16.0	450.0	65.0	0.2316	KNOWN	2.765	1.784
72	73	74	20.0	400.0	65.0	0.0695	KNOWN	0.994	0.641
71	79	73	16.0	220.0	65.0	0.1132	KNOWN	3.760	2.426
68	76	74	16.0	325.0	65.0	0.1673	KNOWN	2.863	1.847
67	75	76	16.0	200.0	65.0	0.1030	KNOWN	4.621	2.981
74	76	77	16.0	375.0	65.0	0.1930	KNOWN	1.758	1.134
75	78	77	12.0	650.0	65.0	1.3582	KNOWN	0.221	0.143

TABLE HPFS-5
STUDY DAY: 1960 OPERATION
125 PSI @ NODE 62

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT MSL	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	7	0	0	15.0	0.000	0.000	KNOWN	346.3		331.3
2	1	6	2	0	15.0	0.000	0.000	KNOWN	346.1		331.1
3	6	4	5	18	18.0	0.000	0.000	KNOWN	346.0		328.0
4	2	4	3	0	18.0	0.000	0.000	KNOWN	346.0		328.0
5	5	3	80	0	25.0	0.000	0.000	KNOWN	345.5		320.5
6	7	18	16	0	17.0	0.000	0.000	KNOWN	346.6		329.6
7	16	17	14	0	15.0	0.000	0.000	KNOWN	348.2		333.2
8	123	111	0	0	12.0	9.665	6.236		357.0	KNOWN	345.0
9	121	19	15	0	18.0	0.000	0.000	KNOWN	347.7		329.7
10	118	119	117	0	15.0	0.000	0.000	KNOWN	341.2		326.2
11	17	22	23	0	10.0	12.047	7.772		357.0	KNOWN	347.0
12	121	22	122	0	12.0	0.000	0.000	KNOWN	352.4		340.4
13	23	122	24	0	10.0	0.000	0.000	KNOWN	352.4		342.4
14	24	25	96	0	17.0	0.000	0.000	KNOWN	348.9		331.9
15	19	25	10	20	20.0	0.000	0.000	KNOWN	346.2		326.2
16	100	101	102	0	22.0	0.000	0.000	KNOWN	342.6		320.6
17	14	15	12	0	15.0	0.000	0.000	KNOWN	347.8		332.8
18	12	9	26	0	22.0	0.000	0.000	KNOWN	345.2		323.2
19	80	9	30	0	38.0	0.000	0.000	KNOWN	345.1		307.1
20	10	100	29	27	22.0	0.000	0.000	KNOWN	344.3		322.3
21	30	29	31	0	45.0	0.000	0.000	KNOWN	343.6		298.6
22	31	32	34	0	50.0	0.000	0.000	KNOWN	341.0		291.0
23	118	120	13	0	15.0	0.000	0.000	KNOWN	340.1		325.1
24	101	32	99	0	36.0	0.000	0.000	KNOWN	342.0		306.0
25	99	28	98	103	18.0	0.000	0.000	KNOWN	342.5		324.5
26	102	97	62	0	18.0	0.000	0.000	KNOWN	342.3		324.3
27	97	105	107	0	22.0	0.000	0.000	KNOWN	343.4		321.4
28	20	26	27	28	15.0	0.000	0.000	KNOWN	345.0		330.0
29	123	96	124	0	15.0	0.000	0.000	KNOWN	346.0		331.0
30	124	104	33	106	18.0	0.000	0.000	KNOWN	343.6		325.6
31	98	104	95	61	18.0	0.000	0.000	KNOWN	342.4		324.4
32	103	95	92	90	18.0	0.000	0.000	KNOWN	342.2		324.2
33	62	93	94	0	17.0	0.000	0.000	KNOWN	341.9		324.9
34	93	115	91	116	15.0	0.000	0.000	KNOWN	340.9		325.9
35	61	92	110	114	17.0	0.000	0.000	KNOWN	342.1		325.1
36	105	94	109	39	25.0	0.000	0.000	KNOWN	342.3		317.3
37	110	11	112	0	18.0	0.000	0.000	KNOWN	342.1		324.1
38	33	109	11	0	20.0	0.000	0.000	KNOWN	342.6		322.6
39	111	115	0	0	22.0	0.000	0.000	KNOWN	347.4		325.4
40	120	112	113	0	16.0	0.000	0.000	KNOWN	340.8		324.8
41	119	114	39	113	18.0	0.000	0.000	KNOWN	341.8		323.8
42	13	89	88	0	10.0	0.000	0.000	KNOWN	338.0		328.0
43	117	90	84	0	15.0	0.000	0.000	KNOWN	341.0		326.0
44	91	83	85	82	16.0	0.000	0.000	KNOWN	335.2		319.2
45	116	89	83	0	15.0	0.000	0.000	KNOWN	337.7		322.7
46	88	84	87	0	10.0	0.000	0.000	KNOWN	337.6		327.6
47	85	87	86	0	10.0	0.000	0.000	KNOWN	336.6		326.6
48	86	63	81	0	10.0	0.000	0.000	KNOWN	336.0		326.0
49	38	37	42	0	18.0	0.000	0.000	KNOWN	306.5		288.5
50	82	64	65	0	15.0	0.000	0.000	KNOWN	331.5		316.5
51	38	47	0	0	15.0	0.000	0.000	KNOWN	306.2		291.2
52	63	64	60	70	17.0	0.000	0.000	KNOWN	329.7		312.7
53	81	66	80	0	12.0	0.000	0.000	KNOWN	329.6		317.6
54	34	35	36	0	19.0	0.000	0.000	KNOWN	311.4		292.4
55	37	35	0	0	18.0	0.000	0.000	KNOWN	307.0		289.0
56	60	58	59	0	18.0	0.000	0.000	KNOWN	328.3		310.3
57	36	40	0	0	17.0	0.000	0.000	KNOWN	309.5		292.5
58	42	41	43	0	10.0	0.000	0.000	KNOWN	305.9		295.9
59	40	41	45	0	15.0	0.000	0.000	KNOWN	305.8		290.8
60	43	44	44	0	10.0	0.000	0.000	KNOWN	305.7		295.7
61	47	45	44	46	13.0	0.000	0.000	KNOWN	305.1		292.1
62	46	49	54	0	14.0	-21.712	-14.008		301.5	KNOWN	287.5
63	48	49	50	0	10.0	0.000	0.000	KNOWN	306.2		296.2
64	50	51	21	0	10.0	0.000	0.000	KNOWN	323.9		313.9
65	51	77	52	0	14.0	0.000	0.000	KNOWN	325.3		311.3
66	107	108	106	0	19.0	0.000	0.000	KNOWN	344.0		325.0
67	77	78	79	0	10.0	0.000	0.000	KNOWN	326.8		316.8
68	21	78	76	0	10.0	0.000	0.000	KNOWN	325.9		315.9
69	76	69	73	0	12.0	0.000	0.000	KNOWN	327.1		315.1
70	52	53	56	0	15.0	0.000	0.000	KNOWN	325.8		310.8
71	54	53	55	0	17.0	0.000	0.000	KNOWN	321.6		304.6
72	58	55	57	0	17.0	0.000	0.000	KNOWN	325.8		308.8
73	57	72	71	0	17.0	0.000	0.000	KNOWN	327.1		310.1
74	69	56	72	68	15.0	0.000	0.000	KNOWN	327.1		312.1
75	65	66	67	0	13.0	0.000	0.000	KNOWN	329.7		316.7
76	68	67	74	0	13.0	0.000	0.000	KNOWN	328.1		315.1
77	73	74	75	0	12.0	0.000	0.000	KNOWN	327.6		315.6
78	80	79	75	0	11.0	0.000	0.000	KNOWN	327.7		316.7
79	70	59	71	0	17.0	0.000	0.000	KNOWN	328.3		311.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
1	1	2	16.0	700.0	65.0	0.3603	KNOWN	0.720	0.464
7	6	1	16.0	1200.0	65.0	0.6177	KNOWN	0.720	0.464
6	2	3	12.0	800.0	65.0	1.6716	KNOWN	0.203	0.131
2	2	4	16.0	960.0	65.0	0.4942	KNOWN	0.516	0.333
4	3	4	16.0	710.0	65.0	0.3655	KNOWN	0.370	0.239
5	3	5	16.0	460.0	65.0	0.2368	KNOWN	1.514	0.977
18	6	3	16.0	460.0	65.0	0.2368	KNOWN	1.681	1.084
3	4	5	16.0	1100.0	65.0	0.5662	KNOWN	0.886	0.572
80	5	19	20.0	525.0	65.0	0.0912	KNOWN	2.401	1.549
16	7	6	16.0	600.0	65.0	0.3089	KNOWN	2.401	1.549
17	11	7	16.0	900.0	65.0	0.4633	KNOWN	4.901	3.162
14	7	17	20.0	455.0	65.0	0.0790	KNOWN	2.500	1.613
123	8	29	12.0	320.0	65.0	0.6687	KNOWN	4.542	2.930
111	8	39	18.5	1860.0	65.0	0.4660	KNOWN	5.123	3.305
121	12	9	12.0	305.0	65.0	0.6373	KNOWN	2.951	1.904
19	9	15	20.0	610.0	65.0	0.1059	KNOWN	4.161	2.684
15	17	9	20.0	475.0	65.0	0.0825	KNOWN	1.210	0.780
118	10	23	12.0	710.0	65.0	1.4836	KNOWN	0.866	0.559
119	41	10	12.0	160.0	65.0	0.3343	KNOWN	1.340	0.865
117	10	43	12.0	500.0	65.0	1.0448	KNOWN	0.474	0.306
22	11	12	12.0	355.0	65.0	0.7418	KNOWN	2.683	1.731
23	11	13	16.0	555.0	65.0	0.2857	KNOWN	4.464	2.880
122	13	12	12.0	280.0	65.0	0.5851	KNOWN	0.269	0.173
24	13	14	16.0	480.0	65.0	0.2471	KNOWN	4.195	2.706
25	14	15	16.0	555.0	65.0	0.2857	KNOWN	3.396	2.191
96	14	29	12.0	2140.0	65.0	4.4716	KNOWN	0.799	0.515
10	15	20	16.0	1740.0	65.0	0.8957	KNOWN	1.504	0.970
20	15	28	20.0	250.0	65.0	0.0434	KNOWN	6.053	3.905
100	20	16	16.0	900.0	65.0	0.4633	KNOWN	2.011	1.298
101	16	24	12.0	530.0	65.0	1.1075	KNOWN	0.726	0.468
102	16	26	16.0	295.0	65.0	0.1519	KNOWN	1.286	0.829
12	17	18	12.0	775.0	65.0	1.6194	KNOWN	1.291	0.833
9	18	19	16.0	1155.0	42.0	1.3337	KNOWN	0.280	0.181
26	18	28	16.0	425.0	65.0	0.2188	KNOWN	1.010	0.652
30	19	21	16.0	470.0	65.0	0.2419	KNOWN	2.681	1.730
29	20	21	16.0	1000.0	65.0	0.5148	KNOWN	1.195	0.771
27	28	20	16.0	500.0	65.0	0.2574	KNOWN	1.703	1.098
31	21	22	16.0	400.0	65.0	0.2059	KNOWN	3.876	2.501
32	24	22	16.0	550.0	65.0	0.2831	KNOWN	1.918	1.237
34	22	54	16.0	2220.0	65.0	1.1427	KNOWN	5.794	3.738
120	40	23	20.0	230.0	65.0	0.0399	KNOWN	4.673	3.015
13	23	42	20.0	500.0	65.0	0.0868	KNOWN	5.539	3.574
99	25	24	16.0	780.0	65.0	0.4015	KNOWN	1.192	0.769
28	28	25	16.0	780.0	65.0	0.4015	KNOWN	2.647	1.708
98	25	31	16.0	440.0	65.0	0.2265	KNOWN	0.625	0.404
103	25	32	16.0	1015.0	65.0	0.5225	KNOWN	0.829	0.535
97	27	26	12.0	1120.0	65.0	2.3403	KNOWN	0.640	0.413
62	26	33	16.0	275.0	65.0	0.1416	KNOWN	1.925	1.242
105	27	36	12.0	780.0	65.0	1.6298	KNOWN	0.777	0.502
107	66	27	12.0	170.0	65.0	0.3552	KNOWN	1.417	0.914
108	28	66	18.0	500.0	65.0	0.1450	KNOWN	2.713	1.751
124	29	30	16.0	210.0	65.0	0.1081	KNOWN	5.341	3.446
104	30	31	12.0	650.0	65.0	1.3582	KNOWN	0.911	0.588
33	30	38	20.0	210.0	65.0	0.0365	KNOWN	5.726	3.694
106	66	30	16.0	560.0	65.0	0.2883	KNOWN	1.296	0.836
95	31	32	12.0	470.0	65.0	0.9821	KNOWN	0.502	0.324
61	31	35	16.0	575.0	65.0	0.2960	KNOWN	1.034	0.667
92	32	35	20.0	850.0	65.0	0.1476	KNOWN	0.498	0.321
90	32	43	12.0	800.0	65.0	1.6716	KNOWN	0.834	0.538
93	33	34	20.0	445.0	65.0	0.0773	KNOWN	3.947	2.547
94	36	33	20.0	745.0	65.0	0.1294	KNOWN	2.022	1.305
115	39	34	16.0	615.0	65.0	0.3166	KNOWN	5.123	3.305
91	34	44	12.0	1360.0	65.0	2.8418	KNOWN	1.451	0.936
116	34	45	20.0	425.0	65.0	0.0738	KNOWN	7.620	4.916
110	35	37	20.0	700.0	65.0	0.1215	KNOWN	0.318	0.205
114	35	41	16.0	430.0	65.0	0.2213	KNOWN	1.214	0.783
109	38	36	20.0	290.0	65.0	0.0504	KNOWN	2.671	1.723
39	36	41	16.0	545.0	65.0	0.2805	KNOWN	1.426	0.920
11	38	37	20.0	400.0	65.0	0.0695	KNOWN	3.055	1.971
112	37	40	20.0	800.0	65.0	0.1389	KNOWN	3.374	2.177
113	41	40	12.0	300.0	65.0	0.6269	KNOWN	1.299	0.838
89	42	45	12.0	650.0	65.0	1.3582	KNOWN	0.450	0.290
88	42	46	20.0	110.0	65.0	0.0191	KNOWN	5.090	3.284
84	43	46	12.0	970.0	65.0	2.0268	KNOWN	1.308	0.844
83	45	44	20.0	300.0	65.0	0.0521	KNOWN	8.070	5.206
85	47	44	12.0	670.0	65.0	1.4000	KNOWN	0.994	0.641
82	44	50	20.0	275.0	65.0	0.0478	KNOWN	10.515	6.784
87	46	47	20.0	190.0	65.0	0.0330	KNOWN	6.397	4.127
86	47	48	20.0	140.0	65.0	0.0243	KNOWN	5.403	3.486
63	48	52	12.0	1450.0	65.0	3.0298	KNOWN	1.492	0.963
81	48	53	16.0	1000.0	65.0	0.5148	KNOWN	3.911	2.523
38	49	51	16.0	600.0	65.0	0.3089	KNOWN	1.003	0.647
37	55	49	16.0	210.0	65.0	0.1081	KNOWN	2.330	1.503
42	49	58	16.0	770.0	65.0	0.3964	KNOWN	1.327	0.856
64	50	52	20.0	540.0	65.0	0.0938	KNOWN	4.929	3.180
65	50	75	20.0	425.0	65.0	0.0738	KNOWN	5.586	3.604
47	51	61	12.0	550.0	65.0	1.1492	KNOWN	1.003	0.647
60	52	56	16.0	500.0	65.0	0.2574	KNOWN	2.487	1.604
70	52	79	16.0	210.0	65.0	0.1081	KNOWN	3.934	2.538
66	75	53	20.0	360.0	65.0	0.0625	KNOWN	1.234	0.796
80	53	78	20.0	525.0	65.0	0.0912	KNOWN	5.145	3.319
35	54	55	12.0	440.0	65.0	0.9194	KNOWN	2.330	1.503
36	54	57	16.0	375.0	65.0	0.1930	KNOWN	3.464	2.235
58	56	72	16.0	690.0	65.0	0.3552	KNOWN	2.879	1.857
59	79	56	16.0	275.0	65.0	0.1416	KNOWN	0.392	0.253
40	57	59	16.0	730.0	65.0	0.3758	KNOWN	3.464	2.235
41	58	59	12.0	510.0	65.0	1.0657	KNOWN	0.257	0.166
43	58	60	16.0	190.0	65.0	0.0978	KNOWN	1.069	0.690
45	59	61	20.0	360.0	65.0	0.0625	KNOWN	3.721	2.400
44	60	61	16.0	330.0	65.0	0.1699	KNOWN	2.127	1.372
48	63	60	16.0	840.0	65.0	0.4324	KNOWN	1.052	0.678
46	61	62	20.0	580.0	65.0	0.1007	KNOWN	6.852	4.420
49	63	62	20.0	670.0	65.0	0.1163	KNOWN	7.384	4.764
54	71	62	16.0	940.0	65.0	0.4839	KNOWN	7.476	4.823
50	64	63	20.0	1960.0	65.0	0.3403	KNOWN	8.441	5.446
51	65	64	20.0	880.0	65.0	0.1528	KNOWN	3.372	2.175
21	68	64	20.0	575.0	65.0	0.0998	KNOWN	5.070	3.271
77	67	65	16.0	690.0	65.0	0.3552	KNOWN	2.127	1.372
52	70	65	17.9	950.0	65.0	0.2831	KNOWN	1.244	0.803
78	67	68	20.0	740.0	65.0	0.1285	KNOWN	2.809	1.812
79	78	67	20.0	280.0	65.0	0.0486	KNOWN	4.936	3.185
76	69	68	20.0	1475.0	65.0	0.2561	KNOWN	2.261	1.458
69	74	69	20.0	390.0	65.0	0.0677	KNOWN	0.396	0.256
73	77	69	16.0	350.0	65.0	0.1802	KNOWN	1.864	1.203
53	70	71	12.0	560.0	65.0	1.1701	KNOWN	1.993	1.286
56	74	70	16.0	290.0	65.0	0.1493	KNOWN	3.237	2.089
55	72	71	16.0	350.0	65.0	0.1802	KNOWN	5.483	3.538
57	73	72	16.0	450.0	65.0	0.2316	KNOWN	2.605	1.680
72	73	74	20.0	400.0	65.0	0.0695	KNOWN	0.937	0.605
71	79	73	16.0	220.0	65.0	0.1132	KNOWN	3.542	2.285
68	76	74	16.0	325.0	65.0	0.1673	KNOWN	2.696	1.740
67	75	76	16.0	200.0	65.0	0.1030	KNOWN	4.392	2.808
74	76	77	16.0	375.0	65.0	0.1930	KNOWN	1.656	1.068
75	78	77	12.0	650.0	65.0	1.3582	KNOWN	0.208	0.134

Boston Water

APPENDIX SHS

COMPUTER ANALYSIS

Charles A. Maguire & Associates

Boston Hartford Providence

TABLE - SHS1

01:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-0.697	-0.450	KNOWN	259.1		144.1
2	1	3	4	0	60.0	-0.310	-0.200	KNOWN	260.5		200.5
3	3	5	2	18	40.0	-1.627	-1.050	KNOWN	260.2		220.2
4	51	50	52	0	110.0	-1.782	-1.150	KNOWN	257.5		147.5
5	51	53	58	0	140.0	-0.450	-0.290	KNOWN	256.2		116.2
6	4	5	6	11	40.0	-0.232	-0.150	KNOWN	260.9		220.9
7	6	8	7	0	95.0	-0.155	-0.100	KNOWN	262.0		167.0
8	8	10	0	0	30.0	23.878	15.404		263.0	KNOWN	233.0
9	11	7	9	12	80.0	-0.620	-0.400	KNOWN	262.1		182.1
10	9	103	0	0	100.0	6.867	4.430	KNOWN	263.1		163.1
11	14	93	13	0	50.0	-0.636	-0.410	KNOWN	257.6		207.6
12	14	15	34	0	80.0	-0.853	-0.550	KNOWN	260.6		180.6
13	16	50	90	15	125.0	-1.922	-1.240	KNOWN	260.3		135.3
14	17	2	46	0	30.0	-0.620	-0.400	KNOWN	256.2		226.2
15	18	20	0	0	20.0	-0.124	-0.080	KNOWN	258.8		238.8
16	19	20	21	26	20.0	-0.124	-0.080	KNOWN	258.7		238.7
17	21	22	24	23	20.0	-0.542	-0.350	KNOWN	259.1		239.1
18	10	22	92	0	40.0	-0.310	-0.200	KNOWN	261.8		221.8
19	24	25	45	0	20.0	-0.124	-0.080	KNOWN	257.6		237.6
20	26	25	41	0	20.0	-0.450	-0.290	KNOWN	257.5		237.5
21	27	95	28	0	20.0	-0.232	-0.150	KNOWN	256.7		236.7
22	95	29	32	0	20.0	-0.124	-0.080	KNOWN	255.5		235.5
23	28	29	44	0	20.0	-0.914	-0.590	KNOWN	254.9		234.9
24	35	33	0	0	20.0	-1.503	-0.970	KNOWN	248.4		228.4
25	35	37	0	0	20.0	-0.542	-0.350	KNOWN	248.3		228.3
26	37	38	40	42	20.0	-0.217	-0.140	KNOWN	248.5		228.5
27	38	39	0	0	20.0	-0.976	-0.630	KNOWN	248.0		228.0
28	32	33	48	0	25.0	-0.759	-0.490	KNOWN	253.4		228.4
29	40	39	0	0	20.0	-0.108	-0.070	KNOWN	248.3		228.3
30	44	42	43	0	20.0	-2.278	-1.470	KNOWN	254.1		234.1
31	46	48	49	0	40.0	-0.868	-0.560	KNOWN	255.0		215.0
32	52	53	49	54	95.0	-0.387	-0.250	KNOWN	256.5		161.5
33	54	55	56	0	110.0	-1.224	-0.790	KNOWN	253.6		143.6
34	58	55	57	60	75.0	-0.682	-0.440	KNOWN	252.8		177.8
35	56	57	62	61	80.0	-0.682	-0.440	KNOWN	251.7		171.7
36	62	63	75	0	80.0	-0.527	-0.340	KNOWN	251.1		171.1
37	61	63	64	66	75.0	-0.527	-0.340	KNOWN	250.5		175.5
38	64	70	69	65	60.0	-0.605	-0.390	KNOWN	247.7		187.7
39	70	71	73	72	20.0	-0.651	-0.420	KNOWN	248.6		228.6
40	71	68	0	0	20.0	-0.682	-0.440	KNOWN	246.7		226.7
41	75	73	76	74	70.0	-0.387	-0.250	KNOWN	250.5		180.5
42	72	76	77	0	40.0	-0.416	-0.268		250.5	KNOWN	210.5
43	67	102	0	0	20.0	-0.542	-0.350	KNOWN	247.5		227.5
44	77	78	79	97	50.0	-2.061	-1.330	KNOWN	246.0		196.0
45	78	80	82	0	40.0	-0.372	-0.240	KNOWN	246.5		206.5
46	79	80	0	0	60.0	-0.930	-0.600	KNOWN	245.6		185.6
47	96	47	83	0	40.0	-0.527	-0.340	KNOWN	252.4		212.4
48	96	85	88	0	70.0	-0.077	-0.050	KNOWN	252.6		182.6
49	85	86	84	0	110.0	-0.077	-0.050	KNOWN	252.1		142.1
50	47	88	31	99	60.0	0.946	0.610	KNOWN	253.1		193.1
51	23	45	41	43	20.0	-10.850	-7.000	KNOWN	257.2		237.2
52	103	34	91	0	80.0	13.998	9.031		261.6	KNOWN	181.6
53	86	0	0	0	120.0	-0.387	-0.250	KNOWN	251.8		131.8
54	87	0	0	0	120.0	-0.837	-0.540	KNOWN	251.0		131.0
55	60	36	0	0	60.0	2.542	1.640	KNOWN	255.5		195.5
56	74	0	0	0	100.0	-0.382	-0.247		250.3	KNOWN	150.3
57	69	68	67	0	25.0	-0.605	-0.390	KNOWN	246.9		221.9
58	12	93	81	0	75.0	-0.217	-0.140	KNOWN	257.9		182.9
59	31	91	81	0	60.0	-0.217	-0.140	KNOWN	257.8		197.8
60	13	0	0	0	40.0	-0.527	-0.340	KNOWN	256.2		216.2
61	30	92	0	0	180.0	-0.232	-0.150	KNOWN	261.2		81.2
62	89	94	0	0	45.0	-0.527	-0.340	KNOWN	260.3		215.3
63	59	99	98	0	100.0	-0.418	-0.270	KNOWN	250.6		150.6
64	97	36	98	0	90.0	-0.573	-0.370	KNOWN	249.5		159.5
65	82	83	84	87	105.0	-0.682	-0.440	KNOWN	251.6		146.6
66	100	66	101	0	60.0	-0.155	-0.100	KNOWN	249.5		189.5
67	65	102	101	0	60.0	-0.155	-0.100	KNOWN	247.7		187.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.674	0.435
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	0.577	0.372
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.554	0.357
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	0.820	0.529
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	1.805	1.165
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	6.403	4.131
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.674	0.435
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	1.372	0.885
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	3.548	2.289
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.467	0.302
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	12.565	8.107
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	10.315	6.655
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.572	0.369
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.590	0.381
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	10.937	7.056
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.574	0.371
90	6	13	36.0	5000.0	70.0	0.0432	KNOWN	4.007	2.585
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	1.376	0.888
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.441	0.284
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	8.676	5.597
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	2.417	1.559
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	15.201	9.807
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	4.670	3.013
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	1.059	0.683
103	10	52	24.0	2400.0	45.0	0.3386	KNOWN	2.196	1.417
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.504	0.325
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	0.658	0.425
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.527	0.340
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	11.139	7.187
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	12.497	8.063
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.087	0.056
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.608	0.392
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	1.248	0.805
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.750	1.129
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	1.516	0.978
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	4.906	3.165
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	13.282	8.569
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	1.527	0.985
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	9.462	6.105
92	18	61	20.0	1440.0	65.0	0.2500	KNOWN	1.609	1.038
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.146	0.094
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	1.258	0.811
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	1.213	0.782
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.418	0.915
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	3.254	2.100
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.518	0.334
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.777	0.501
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	2.858	1.844
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.182	0.118
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	1.686	1.088
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.360	0.232
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.573	0.370
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.512	0.330
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	1.662	1.072
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.403	0.260
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	1.669	1.077
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.083	0.698
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	1.928	1.244
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	7.427	4.792
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.246	0.159
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	5.956	3.843
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.786	0.507
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	0.942	0.607
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.310	0.200
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	4.435	2.861
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.070	0.690
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.556	0.359
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.275	0.178
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	3.632	2.343
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.519	0.335
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.300	0.193
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	1.006	0.649
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	0.708	0.457
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.212	0.137
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.364	0.235
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	1.710	1.103
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.310	0.200
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.318	0.205
76	41	42	36.0	2400.0	70.0	0.0208	KNOWN	1.152	0.743
74	41	56	16.0	3000.0	70.0	1.3464	KNOWN	0.382	0.247
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.426	0.275
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.215	0.139
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	0.757	0.489
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	0.527	0.340
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.253	0.163
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.361	0.878
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	0.677	0.437
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.576	1.017
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	0.440	0.284
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.289	0.186
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.202	0.130
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	3.358	2.167
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	3.876	2.501
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.387	0.250
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	2.893	1.867
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.662	2.363
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	0.443	0.286
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	3.696	2.384
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	0.837	0.540
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	1.600	1.033
81	58	59	12.0	800.0	45.0	3.3005	KNOWN	0.183	0.118
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.334	0.216
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.700	0.452

TABLE - SHS2

02:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-0.634	-0.409	KNOWN	261.3		146.3
2	1	3	4	0	60.0	-0.294	-0.190	KNOWN	262.9		202.9
3	3	5	2	18	40.0	-1.501	-0.968	KNOWN	262.8		222.8
4	51	50	52	0	110.0	-1.640	-1.058	KNOWN	259.0		149.0
5	51	53	58	0	140.0	-0.449	-0.289	KNOWN	257.6		117.6
6	4	5	6	11	40.0	-0.217	-0.140	KNOWN	263.3		223.3
7	6	8	7	0	95.0	-0.139	-0.090	KNOWN	264.6		169.6
8	8	10	0	0	30.0	25.589	16.509		266.0	KNOWN	236.0
9	11	7	9	12	80.0	-0.572	-0.369	KNOWN	264.6		184.6
10	9	103	0	0	100.0	6.545	4.222	KNOWN	265.2		165.2
11	14	93	13	0	50.0	-0.603	-0.389	KNOWN	259.3		209.3
12	14	15	34	0	80.0	-0.805	-0.519	KNOWN	262.2		182.2
13	16	50	90	15	125.0	-1.810	-1.168	KNOWN	262.0		137.0
14	17	2	46	0	30.0	-0.572	-0.369	KNOWN	258.4		228.4
15	18	20	0	0	20.0	-0.108	-0.070	KNOWN	261.9		241.9
16	19	20	21	26	20.0	-0.108	-0.070	KNOWN	261.7		241.7
17	21	22	24	23	20.0	-0.495	-0.319	KNOWN	262.3		242.3
18	10	22	92	0	40.0	-0.294	-0.190	KNOWN	264.8		224.8
19	24	25	45	0	20.0	-0.108	-0.070	KNOWN	261.0		241.0
20	26	25	41	0	20.0	-0.402	-0.260	KNOWN	261.0		241.0
21	27	95	28	0	20.0	-0.201	-0.130	KNOWN	259.9		239.9
22	95	29	32	0	20.0	-0.108	-0.070	KNOWN	258.7		238.7
23	28	29	44	0	20.0	-0.820	-0.529	KNOWN	258.4		238.4
24	35	33	0	0	20.0	-1.470	-0.948	KNOWN	251.6		231.6
25	35	37	0	0	20.0	-0.511	-0.329	KNOWN	251.6		231.6
26	37	38	40	42	20.0	-0.217	-0.140	KNOWN	251.9		231.9
27	38	39	0	0	20.0	-0.944	-0.609	KNOWN	251.4		231.4
28	32	33	48	0	25.0	-0.727	-0.469	KNOWN	255.9		230.9
29	40	39	0	0	20.0	-0.108	-0.070	KNOWN	251.7		231.7
30	44	42	43	0	20.0	-2.027	-1.308	KNOWN	257.6		237.6
31	46	48	49	0	40.0	-0.836	-0.539	KNOWN	257.0		217.0
32	52	53	49	54	95.0	-0.371	-0.240	KNOWN	257.9		162.9
33	54	55	56	0	110.0	-1.207	-0.779	KNOWN	254.4		144.4
34	58	55	57	60	75.0	-0.681	-0.439	KNOWN	253.2		178.2
35	56	57	62	61	80.0	-0.681	-0.439	KNOWN	251.9		171.9
36	62	63	75	0	80.0	-0.526	-0.339	KNOWN	251.0		171.0
37	61	63	64	66	75.0	-0.526	-0.339	KNOWN	250.6		175.6
38	64	70	69	65	60.0	-0.603	-0.389	KNOWN	247.8		187.8
39	70	71	73	72	20.0	-0.619	-0.399	KNOWN	248.5		228.5
40	71	68	0	0	20.0	-0.603	-0.389	KNOWN	246.9		226.9
41	75	73	76	74	70.0	-0.371	-0.240	KNOWN	250.2		180.2
42	72	76	77	0	40.0	-2.449	-1.580		250.0	KNOWN	210.0
43	67	102	0	0	20.0	-0.511	-0.329	KNOWN	247.6		227.6
44	77	78	79	97	50.0	-1.841	-1.188	KNOWN	247.3		197.3
45	78	80	82	0	40.0	-0.371	-0.240	KNOWN	247.8		207.8
46	79	80	0	0	60.0	-0.897	-0.579	KNOWN	246.9		186.9
47	96	47	83	0	40.0	-0.526	-0.339	KNOWN	253.2		213.2
48	96	85	88	0	70.0	-0.077	-0.050	KNOWN	253.3		183.3
49	85	86	84	0	110.0	-0.077	-0.050	KNOWN	252.9		142.9
50	47	88	31	99	60.0	0.634	0.409	KNOWN	253.9		193.9
51	23	45	41	43	20.0	-9.639	-6.219	KNOWN	260.7		240.7
52	103	34	91	0	80.0	11.081	7.149		262.9	KNOWN	182.9
53	86	0	0	0	120.0	-0.371	-0.240	KNOWN	252.7		132.7
54	87	0	0	0	120.0	-0.836	-0.539	KNOWN	251.9		131.9
55	60	36	0	0	60.0	2.414	1.557	KNOWN	255.8		195.8
56	74	0	0	0	100.0	0.391	0.252		250.4	KNOWN	150.4
57	69	68	67	0	25.0	-0.603	-0.389	KNOWN	247.0		222.0
58	12	93	81	0	75.0	-0.201	-0.130	KNOWN	259.6		184.6
59	31	91	81	0	60.0	-0.201	-0.130	KNOWN	259.1		199.1
60	13	0	0	0	40.0	-0.495	-0.319	KNOWN	258.0		218.0
61	30	92	0	0	180.0	-0.217	-0.140	KNOWN	263.8		83.8
62	89	94	0	0	45.0	-0.495	-0.319	KNOWN	262.1		217.1
63	59	99	98	0	100.0	-0.387	-0.250	KNOWN	251.4		151.4
64	97	36	98	0	90.0	-0.557	-0.359	KNOWN	250.4		160.4
65	82	83	84	87	105.0	-0.681	-0.439	KNOWN	252.4		147.4
66	100	66	101	0	60.0	-0.155	-0.100	KNOWN	249.6		189.6
67	65	102	101	0	60.0	-0.155	-0.100	KNOWN	247.8		187.8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.745	0.481
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	0.438	0.283
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.549	0.354
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	0.628	0.405
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	1.668	1.076
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	5.544	3.577
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.703	0.454
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	1.107	0.714
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	2.861	1.846
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.495	0.319
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	12.976	8.372
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	10.841	6.994
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.622	0.402
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.669	0.431
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.774	7.596
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.597	0.385
90	6	13	36.0	5000.0	70.0	0.0432	KNOWN	6.172	3.982
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	1.876	1.210
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.647	0.418
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	10.537	6.798
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	1.376	0.888
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	15.052	9.711
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	3.716	2.397
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	1.170	0.755
103	10	52	24.0	2400.0	45.0	0.3386	KNOWN	2.829	1.825
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.496	0.320
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	0.602	0.389
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.495	0.319
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	8.900	5.742
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	10.201	6.581
94	62	13	16.0	2400.0	50.0	2.0073	KNOWN	0.152	0.098
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.680	0.439
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	0.999	0.645
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	2.147	1.385
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	1.212	0.782
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	4.687	3.024
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	12.665	8.171
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	1.408	0.908
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	8.615	5.558
92	18	61	20.0	1440.0	65.0	0.2500	KNOWN	2.093	1.350
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.210	0.136
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	1.089	0.703
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	1.020	0.658
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.427	0.921
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	3.059	1.973
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.402	0.259
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.917	0.591
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	2.641	1.704
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.080	0.052
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	1.550	1.000
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.430	0.278
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.555	0.358
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.497	0.321
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	1.699	1.096
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.389	0.251
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	1.361	0.878
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.085	0.700
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	1.517	0.979
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	8.330	5.374
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.285	0.184
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.839	4.412
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.897	0.579
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	0.904	0.583
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.280	0.181
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	5.373	3.466
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.114	0.719
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.568	0.366
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.235	0.152
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	4.612	2.976
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.524	0.338
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.299	0.193
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	0.906	0.584
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	0.669	0.431
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.158	0.102
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.334	0.215
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	1.584	1.022
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.274	0.177
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.270	0.174
76	41	42	36.0	2400.0	70.0	0.0208	KNOWN	3.047	1.966
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	0.391	0.252
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.324	0.209
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.204	0.132
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	0.715	0.461
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	0.490	0.316
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.252	0.162
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.279	0.825
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	0.646	0.416
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.507	0.972
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	0.439	0.283
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.283	0.183
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.196	0.126
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	3.276	2.113
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	3.792	2.446
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.371	0.240
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	2.827	1.824
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.874	2.499
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	0.433	0.280
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	3.709	2.393
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	0.836	0.539
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	1.509	0.974
81	58	59	12.0	800.0	45.0	3.3005	KNOWN	0.367	0.236
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.326	0.211
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.712	0.459

TABLE - SHS3

03.00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-0.727	-0.469	KNOWN	261.5		146.5
2	1	3	4	0	60.0	-0.325	-0.210	KNOWN	263.1		203.1
3	3	5	2	18	40.0	-1.717	-1.108	KNOWN	263.0		223.0
4	51	50	52	0	110.0	-1.888	-1.218	KNOWN	259.5		149.5
5	51	53	58	0	140.0	-0.418	-0.270	KNOWN	258.1		118.1
6	4	5	6	11	40.0	-0.248	-0.160	KNOWN	263.5		223.5
7	6	8	7	0	95.0	-0.170	-0.110	KNOWN	264.7		169.7
8	8	10	0	0	30.0	24.599	15.870		266.0	KNOWN	236.0
9	11	7	9	12	80.0	-0.665	-0.429	KNOWN	264.7		184.7
10	9	103	0	0	100.0	6.096	3.933	KNOWN	265.3		165.3
11	14	93	13	0	50.0	-0.572	-0.369	KNOWN	260.0		210.0
12	14	15	34	0	80.0	-0.758	-0.489	KNOWN	262.7		182.7
13	16	50	90	15	125.0	-1.717	-1.108	KNOWN	262.5		137.5
14	17	2	46	0	30.0	-0.665	-0.429	KNOWN	258.6		228.6
15	18	20	0	0	20.0	-0.093	-0.060	KNOWN	262.1		242.1
16	19	20	21	26	20.0	-0.093	-0.060	KNOWN	262.0		242.0
17	21	22	24	23	20.0	-0.572	-0.369	KNOWN	262.6		242.6
18	10	22	92	0	40.0	-0.325	-0.210	KNOWN	264.9		224.9
19	24	25	45	0	20.0	-0.093	-0.060	KNOWN	261.4		241.4
20	26	25	41	0	20.0	-0.387	-0.250	KNOWN	261.4		241.4
21	27	95	28	0	20.0	-0.201	-0.130	KNOWN	260.3		240.3
22	95	29	32	0	20.0	-0.093	-0.060	KNOWN	259.2		239.2
23	28	29	44	0	20.0	-0.758	-0.489	KNOWN	258.9		238.9
24	35	33	0	0	20.0	-1.454	-0.938	KNOWN	252.2		232.2
25	35	37	0	0	20.0	-0.511	-0.329	KNOWN	252.2		232.2
26	37	38	40	42	20.0	-0.217	-0.140	KNOWN	252.5		232.5
27	38	39	0	0	20.0	-0.928	-0.599	KNOWN	252.0		232.0
28	32	33	48	0	25.0	-0.727	-0.469	KNOWN	256.3		231.3
29	40	39	0	0	20.0	-0.108	-0.070	KNOWN	252.3		232.3
30	44	42	43	0	20.0	-1.919	-1.238	KNOWN	258.2		238.2
31	46	48	49	0	40.0	-0.820	-0.529	KNOWN	257.4		217.4
32	52	53	49	54	95.0	-0.340	-0.220	KNOWN	258.4		163.4
33	54	55	56	0	110.0	-1.129	-0.729	KNOWN	254.9		144.9
34	58	55	57	60	75.0	-0.634	-0.409	KNOWN	254.0		179.0
35	56	57	62	61	80.0	-0.634	-0.409	KNOWN	252.4		172.4
36	62	63	75	0	80.0	-0.495	-0.319	KNOWN	251.5		171.5
37	61	63	64	66	75.0	-0.495	-0.319	KNOWN	251.2		176.2
38	64	70	69	65	60.0	-0.572	-0.369	KNOWN	248.5		188.5
39	70	71	73	72	20.0	-0.619	-0.399	KNOWN	249.1		229.1
40	71	68	0	0	20.0	-0.572	-0.369	KNOWN	247.7		227.7
41	75	73	76	74	70.0	-0.340	-0.220	KNOWN	250.6		180.6
42	72	76	77	0	40.0	-2.089	-1.348		250.5	KNOWN	210.5
43	67	102	0	0	20.0	-0.511	-0.329	KNOWN	248.3		228.3
44	77	78	79	97	50.0	-1.717	-1.108	KNOWN	248.9		198.9
45	78	80	82	0	40.0	-0.294	-0.190	KNOWN	249.4		209.4
46	79	80	0	0	60.0	-0.882	-0.569	KNOWN	248.6		188.6
47	96	47	83	0	40.0	-0.495	-0.319	KNOWN	254.5		214.5
48	96	85	88	0	70.0	-0.077	-0.050	KNOWN	254.6		184.6
49	85	86	84	0	110.0	-0.077	-0.050	KNOWN	254.2		144.2
50	47	88	31	99	60.0	0.557	0.359	KNOWN	255.0		195.0
51	23	45	41	43	20.0	-9.113	-5.879	KNOWN	261.1		241.1
52	103	34	91	0	80.0	12.105	7.810		263.5	KNOWN	183.5
53	86	0	0	0	120.0	-0.340	-0.220	KNOWN	254.0		134.0
54	87	0	0	0	120.0	-0.774	-0.499	KNOWN	253.3		133.3
55	60	36	0	0	60.0	2.429	1.567	KNOWN	256.9		196.9
56	74	0	0	0	100.0	-0.377	-0.243		250.4	KNOWN	150.4
57	69	68	67	0	25.0	-0.572	-0.369	KNOWN	247.8		222.8
58	12	93	81	0	75.0	-0.201	-0.130	KNOWN	260.3		185.3
59	31	91	81	0	60.0	-0.201	-0.130	KNOWN	259.9		199.9
60	13	0	0	0	40.0	-0.480	-0.309	KNOWN	258.9		218.9
61	30	92	0	0	180.0	-0.248	-0.160	KNOWN	264.0		84.0
62	89	94	0	0	45.0	-0.480	-0.309	KNOWN	262.5		217.5
63	59	99	98	0	100.0	-0.387	-0.250	KNOWN	252.6		152.6
64	97	36	98	0	90.0	-0.557	-0.359	KNOWN	251.8		161.8
65	82	83	84	87	105.0	-0.634	-0.409	KNOWN	253.8		148.8
66	100	66	101	0	80.0	-0.139	-0.090	KNOWN	250.3		190.3
67	65	102	101	0	60.0	-0.139	-0.090	KNOWN	248.5		188.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.753	0.486
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	0.529	0.341
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.554	0.358
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	0.619	0.399
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	1.697	1.095
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	5.584	3.603
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.711	0.458
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	1.052	0.679
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	2.722	1.756
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.482	0.311
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	13.051	8.420
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	10.681	6.891
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.580	0.374
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.644	0.416
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.238	7.250
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.569	0.367
90	6	13	36.0	5000.0	70.0	0.0432	KNOWN	5.462	3.524
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	1.762	1.137
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.580	0.374
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	10.108	6.521
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	1.300	0.838
10	8	10	42.0	1920.0	70.0	0.0078	KNOWN	14.492	9.350
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	3.631	2.343
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	1.094	0.706
103	10	52	24.0	2400.0	45.0	0.3386	KNOWN	2.465	1.590
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.476	0.307
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	0.570	0.368
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.474	0.306
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	9.735	6.281
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	10.970	7.078
94	62	13	16.0	2400.0	50.0	2.0073	KNOWN	0.099	0.064
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.599	0.387
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	0.960	0.619
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	2.074	1.338
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	1.137	0.733
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	4.527	2.921
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	12.158	7.844
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	1.337	0.862
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	8.175	5.274
92	18	61	20.0	1440.0	65.0	0.2500	KNOWN	2.009	1.296
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.211	0.136
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	1.032	0.666
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	0.962	0.620
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.385	0.893
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	2.941	1.897
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.373	0.241
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.919	0.593
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	2.556	1.649
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.071	0.046
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	1.526	0.984
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.439	0.284
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.546	0.352
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.491	0.317
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	1.693	1.092
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.382	0.247
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	1.334	0.861
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.055	0.681
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	1.554	1.003
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	8.206	5.294
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.252	0.162
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.825	4.403
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.973	0.628
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	0.959	0.618
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.247	0.159
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	5.519	3.561
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.091	0.704
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.554	0.357
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.208	0.134
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	4.815	3.107
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.515	0.332
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.289	0.187
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	0.835	0.538
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	0.638	0.412
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.139	0.090
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.314	0.202
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	1.504	0.970
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.263	0.170
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.259	0.167
76	41	42	36.0	2400.0	70.0	0.0208	KNOWN	2.594	1.673
74	41	56	16.0	3000.0	70.0	1.3464	KNOWN	0.377	0.243
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.241	0.156
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.193	0.125
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	0.704	0.454
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	0.506	0.326
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.238	0.153
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.208	0.780
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	0.644	0.415
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.444	0.931
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	0.413	0.266
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.267	0.172
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.185	0.119
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	3.085	1.991
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	3.575	2.307
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.340	0.220
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	2.666	1.720
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.720	2.400
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	0.435	0.281
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	3.601	2.323
87	65	54	20.0	16000.0	130.0	0.7787	KNOWN	0.774	0.499
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	1.470	0.949
81	58	59	12.0	800.0	45.0	3.3005	KNOWN	0.319	0.206
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.295	0.190
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.704	0.454

TABLE - SHS4

04:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-0.774	-0.499	KNOWN	261.1		146.1
2	1	3	4	0	60.0	-0.340	-0.220	KNOWN	262.9		202.9
3	3	5	2	18	40.0	-1.810	-1.168	KNOWN	262.7		222.7
4	51	50	52	0	110.0	-1.980	-1.278	KNOWN	259.1		149.1
5	51	53	58	0	140.0	-0.387	-0.250	KNOWN	257.8		117.8
6	4	5	6	11	40.0	-0.263	-0.170	KNOWN	263.3		223.3
7	6	8	7	0	95.0	-0.170	-0.110	KNOWN	264.6		169.6
8	8	10	0	0	30.0	25.694	16.577		266.0	KNOWN	236.0
9	11	7	9	12	80.0	-0.696	-0.449	KNOWN	264.6		184.6
10	9	103	0	0	100.0	6.560	4.232	KNOWN	265.2		165.2
11	14	93	13	0	50.0	-0.572	-0.369	KNOWN	260.0		210.0
12	14	15	34	0	80.0	-0.758	-0.489	KNOWN	262.3		182.3
13	16	50	90	15	125.0	-1.717	-1.108	KNOWN	262.1		137.1
14	17	2	46	0	30.0	-0.696	-0.449	KNOWN	258.1		228.1
15	18	20	0	0	20.0	-0.108	-0.070	KNOWN	261.8		241.8
16	19	20	21	26	20.0	-0.108	-0.070	KNOWN	261.7		241.7
17	21	22	24	23	20.0	-0.603	-0.389	KNOWN	262.3		242.3
18	10	22	92	0	40.0	-0.340	-0.220	KNOWN	264.8		224.8
19	24	25	45	0	20.0	-0.108	-0.070	KNOWN	261.1		241.1
20	26	25	41	0	20.0	-0.387	-0.250	KNOWN	261.0		241.0
21	27	95	28	0	20.0	-0.201	-0.130	KNOWN	260.0		240.0
22	95	29	32	0	20.0	-0.108	-0.070	KNOWN	258.8		238.8
23	28	29	44	0	20.0	-0.805	-0.519	KNOWN	258.4		238.4
24	35	33	0	0	20.0	-1.439	-0.928	KNOWN	251.8		231.8
25	35	37	0	0	20.0	-0.511	-0.329	KNOWN	251.8		231.8
26	37	38	40	42	20.0	-0.217	-0.140	KNOWN	252.1		232.1
27	38	39	0	0	20.0	-0.928	-0.599	KNOWN	251.6		231.6
28	32	33	48	0	25.0	-0.727	-0.469	KNOWN	256.0		231.0
29	40	39	0	0	20.0	-0.108	-0.070	KNOWN	251.9		231.9
30	44	42	43	0	20.0	-1.996	-1.288	KNOWN	257.7		237.7
31	46	48	49	0	40.0	-0.820	-0.529	KNOWN	257.1		217.1
32	52	53	49	54	95.0	-0.340	-0.220	KNOWN	258.1		163.1
33	54	55	56	0	110.0	-1.052	-0.679	KNOWN	254.8		144.8
34	58	55	57	60	75.0	-0.603	-0.389	KNOWN	253.9		178.9
35	56	57	62	61	80.0	-0.603	-0.389	KNOWN	252.4		172.4
36	62	63	75	0	80.0	-0.464	-0.299	KNOWN	251.5		171.5
37	61	63	64	66	75.0	-0.464	-0.299	KNOWN	251.2		176.2
38	64	70	69	65	60.0	-0.526	-0.339	KNOWN	248.6		188.6
39	70	71	73	72	20.0	-0.619	-0.399	KNOWN	249.2		229.2
40	71	68	0	0	20.0	-0.603	-0.389	KNOWN	247.8		227.8
41	75	73	76	74	70.0	-0.340	-0.220	KNOWN	250.6		180.6
42	72	76	77	0	40.0	-2.174	-1.402		250.5	KNOWN	210.5
43	67	102	0	0	20.0	-0.511	-0.329	KNOWN	248.4		228.4
44	77	78	79	97	50.0	-1.795	-1.158	KNOWN	249.8		199.8
45	78	80	82	0	40.0	0.062	0.040	KNOWN	250.8		210.8
46	79	80	0	0	60.0	-0.928	-0.599	KNOWN	249.6		189.6
47	96	47	83	0	40.0	-0.464	-0.299	KNOWN	255.6		215.6
48	96	85	88	0	70.0	-0.062	-0.040	KNOWN	255.7		185.7
49	85	86	84	0	110.0	-0.062	-0.040	KNOWN	255.4		145.4
50	47	88	31	99	60.0	0.897	0.579	KNOWN	256.2		196.2
51	23	45	41	43	20.0	-9.485	-6.119	KNOWN	260.8		240.8
52	103	34	91	0	80.0	10.787	6.960		263.0	KNOWN	183.0
53	86	0	0	0	120.0	-0.340	-0.220	KNOWN	255.2		135.2
54	87	0	0	0	120.0	-0.727	-0.469	KNOWN	254.5		134.5
55	60	36	0	0	60.0	2.228	1.437	KNOWN	256.4		196.4
56	74	0	0	0	100.0	-0.377	-0.243		250.4	KNOWN	150.4
57	69	68	67	0	25.0	-0.526	-0.339	KNOWN	247.9		222.9
58	12	93	81	0	75.0	-0.201	-0.130	KNOWN	260.3		185.3
59	31	91	81	0	60.0	-0.201	-0.130	KNOWN	260.0		200.0
60	13	0	0	0	40.0	-0.480	-0.309	KNOWN	258.8		218.8
61	30	92	0	0	180.0	-0.263	-0.170	KNOWN	263.8		83.8
62	89	94	0	0	45.0	-0.480	-0.309	KNOWN	262.2		217.2
63	59	99	98	0	100.0	-0.402	-0.260	KNOWN	253.0		153.0
64	97	36	98	0	90.0	-0.572	-0.369	KNOWN	252.1		162.1
65	82	83	84	87	105.0	-0.603	-0.389	KNOWN	255.0		150.0
66	100	66	101	0	60.0	-0.139	-0.090	KNOWN	250.3		190.3
67	65	102	101	0	60.0	-0.139	-0.090	KNOWN	248.6		188.6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.790	0.510
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	0.536	0.346
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.553	0.356
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	0.629	0.406
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	1.759	1.135
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	5.758	3.715
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.722	0.466
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	1.076	0.694
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	2.778	1.792
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.469	0.302
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	12.914	8.331
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	10.464	6.751
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.548	0.353
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.630	0.406
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.836	7.636
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.600	0.387
90	6	13	36.0	5000.0	70.0	0.0432	KNOWN	5.897	3.805
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	1.860	1.200
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.620	0.400
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	10.589	6.832
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	1.417	0.914
10	8	10	42.0	1920.0	70.0	0.0078	KNOWN	15.105	9.745
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	3.789	2.445
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	1.076	0.694
103	10	52	24.0	2400.0	45.0	0.3386	KNOWN	2.771	1.788
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.437	0.282
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	0.615	0.397
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.480	0.309
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	9.130	5.890
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	10.329	6.661
94	62	13	16.0	2400.0	50.0	2.0073	KNOWN	0.140	0.090
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.579	0.373
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	0.967	0.624
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	2.161	1.394
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	1.177	0.759
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	4.622	2.982
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	12.641	8.155
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	1.388	0.896
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	8.488	5.476
92	18	61	20.0	1440.0	65.0	0.2500	KNOWN	2.123	1.370
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.210	0.136
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	1.070	0.690
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	1.000	0.645
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.409	0.909
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	3.012	1.943
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.392	0.253
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.908	0.586
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	2.600	1.677
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.086	0.056
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	1.525	0.984
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.424	0.274
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.546	0.352
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.491	0.317
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	1.678	1.082
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.382	0.247
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	1.345	0.867
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.073	0.693
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	1.586	1.023
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	7.990	5.155
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.247	0.159
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.691	4.317
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.955	0.616
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	0.884	0.570
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.202	0.130
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	5.439	3.509
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.061	0.685
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.543	0.350
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.196	0.126
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	4.777	3.082
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.507	0.327
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.287	0.185
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	0.800	0.516
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	0.630	0.407
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.150	0.097
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.309	0.199
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	1.471	0.949
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.257	0.166
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.294	0.190
76	41	42	36.0	2400.0	70.0	0.0208	KNOWN	2.597	1.675
74	41	56	16.0	3000.0	70.0	1.3464	KNOWN	0.377	0.243
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.160	0.103
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.190	0.123
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	0.701	0.452
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	0.718	0.463
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.159	0.103
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.077	0.695
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	0.769	0.496
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.425	0.919
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	0.388	0.251
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.255	0.165
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.179	0.116
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	2.978	1.921
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	3.428	2.212
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.340	0.220
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	2.576	1.662
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.291	2.124
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	0.505	0.326
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	3.234	2.086
87	65	54	20.0	16000.0	130.0	0.7787	KNOWN	0.727	0.469
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	1.344	0.867
81	58	59	12.0	800.0	45.0	3.3005	KNOWN	0.259	0.167
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.305	0.197
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.690	0.445

TABLE - SHS5

05:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-0.897	-0.579	KNOWN	259.9		144.9
2	1	3	4	0	60.0	-0.402	-0.260	KNOWN	262.2		202.2
3	3	5	2	18	40.0	-2.089	-1.348	KNOWN	262.1		222.1
4	51	50	52	0	110.0	-2.290	-1.477	KNOWN	257.9		147.9
5	51	53	58	0	140.0	-0.542	-0.349	KNOWN	256.4		116.4
6	4	5	6	11	40.0	-0.294	-0.190	KNOWN	262.6		222.6
7	6	8	7	0	95.0	-0.201	-0.130	KNOWN	264.2		169.2
8	8	10	0	0	30.0	27.636	17.829		266.0	KNOWN	236.0
9	11	7	9	12	80.0	-0.805	-0.519	KNOWN	264.2		184.2
10	9	103	0	0	100.0	6.870	4.432	KNOWN	264.7		164.7
11	14	93	13	0	50.0	-0.588	-0.379	KNOWN	259.0		209.0
12	14	15	34	0	80.0	-0.789	-0.509	KNOWN	261.0		181.0
13	16	50	90	15	125.0	-1.764	-1.138	KNOWN	260.9		135.9
14	17	2	46	0	30.0	-0.805	-0.519	KNOWN	256.9		226.9
15	18	20	0	0	20.0	-0.093	-0.060	KNOWN	261.5		241.5
16	19	20	21	26	20.0	-0.093	-0.060	KNOWN	261.5		241.5
17	21	22	24	23	20.0	-0.696	-0.449	KNOWN	262.2		242.2
18	10	22	92	0	40.0	-0.402	-0.260	KNOWN	264.7		224.7
19	24	25	45	0	20.0	-0.093	-0.060	KNOWN	261.1		241.1
20	26	25	41	0	20.0	-0.371	-0.240	KNOWN	261.0		241.0
21	27	95	28	0	20.0	-0.186	-0.120	KNOWN	259.7		239.7
22	95	29	32	0	20.0	-0.093	-0.060	KNOWN	258.5		238.5
23	28	29	44	0	20.0	-0.743	-0.479	KNOWN	258.3		238.3
24	35	33	0	0	20.0	-1.454	-0.938	KNOWN	251.1		231.1
25	35	37	0	0	20.0	-0.526	-0.339	KNOWN	251.1		231.1
26	37	38	40	42	20.0	-0.217	-0.140	KNOWN	251.5		231.5
27	38	39	0	0	20.0	-0.944	-0.609	KNOWN	251.0		231.0
28	32	33	48	0	25.0	-0.727	-0.469	KNOWN	255.1		230.1
29	40	39	0	0	20.0	-0.093	-0.060	KNOWN	251.3		231.3
30	44	42	43	0	20.0	-1.857	-1.198	KNOWN	257.6		237.6
31	46	48	49	0	40.0	-0.820	-0.529	KNOWN	255.9		215.9
32	52	53	49	54	95.0	-0.449	-0.289	KNOWN	256.8		161.8
33	54	55	56	0	110.0	-1.439	-0.928	KNOWN	253.7		143.7
34	58	55	57	60	75.0	-0.805	-0.519	KNOWN	252.9		177.9
35	56	57	62	61	80.0	-0.805	-0.519	KNOWN	251.6		171.6
36	62	63	75	0	80.0	-0.619	-0.399	KNOWN	251.0		171.0
37	61	63	64	66	75.0	-0.619	-0.399	KNOWN	250.3		175.3
38	64	70	69	65	60.0	-0.712	-0.459	KNOWN	247.5		187.5
39	70	71	73	72	20.0	-0.619	-0.399	KNOWN	248.5		228.5
40	71	68	0	0	20.0	-0.557	-0.359	KNOWN	246.6		226.6
41	75	73	76	74	70.0	-0.449	-0.289	KNOWN	250.5		180.5
42	72	76	77	0	40.0	-0.617	-0.398		250.5	KNOWN	210.5
43	67	102	0	0	20.0	-0.526	-0.339	KNOWN	247.3		227.3
44	77	78	79	97	50.0	-1.671	-1.078	KNOWN	250.5		200.5
45	78	80	82	0	40.0	1.315	0.848	KNOWN	252.7		212.7
46	79	80	0	0	60.0	-1.331	-0.858	KNOWN	250.3		190.3
47	96	47	83	0	40.0	-0.619	-0.399	KNOWN	255.3		215.3
48	96	85	88	0	70.0	-0.093	-0.060	KNOWN	255.4		185.4
49	85	86	84	0	110.0	-0.093	-0.060	KNOWN	255.1		145.1
50	47	88	31	99	60.0	1.547	0.998	KNOWN	255.9		195.9
51	23	45	41	43	20.0	-8.773	-5.660	KNOWN	260.8		240.8
52	103	34	91	0	80.0	8.618	5.560		261.6	KNOWN	181.6
53	86	0	0	0	120.0	-0.449	-0.289	KNOWN	254.7		134.7
54	87	0	0	0	120.0	-0.975	-0.629	KNOWN	253.9		133.9
55	60	36	0	0	60.0	2.445	1.577	KNOWN	256.3		196.3
56	74	0	0	0	100.0	-0.375	-0.242		250.3	KNOWN	150.3
57	69	68	67	0	25.0	-0.712	-0.459	KNOWN	246.6		221.6
58	12	93	81	0	75.0	-0.201	-0.130	KNOWN	259.4		184.4
59	31	91	81	0	60.0	-0.201	-0.130	KNOWN	259.1		199.1
60	13	0	0	0	40.0	-0.480	-0.309	KNOWN	257.9		217.9
61	30	92	0	0	180.0	-0.294	-0.190	KNOWN	263.4		83.4
62	89	94	0	0	45.0	-0.480	-0.309	KNOWN	261.1		216.1
63	59	99	98	0	100.0	-0.588	-0.379	KNOWN	252.0		152.0
64	97	36	98	0	90.0	-0.836	-0.539	KNOWN	251.6		161.6
65	82	83	84	87	105.0	-0.805	-0.519	KNOWN	254.6		149.6
66	100	66	101	0	60.0	-0.186	-0.120	KNOWN	249.2		189.2
67	65	102	101	0	60.0	-0.186	-0.120	KNOWN	247.5		187.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.917	0.592
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	0.540	0.349
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.560	0.361
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	0.485	0.313
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	1.804	1.164
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	5.516	3.559
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.781	0.504
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	0.875	0.564
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	2.257	1.456
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.484	0.312
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	13.139	8.477
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	10.365	6.687
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.654	0.422
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.597	0.385
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	12.853	8.293
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.646	0.416
90	6	13	36.0	5000.0	70.0	0.0432	KNOWN	7.342	4.737
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	2.204	1.422
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.747	0.482
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	12.095	7.804
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	0.959	0.619
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	15.540	10.026
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	3.543	2.286
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	1.134	0.732
103	10	52	24.0	2400.0	45.0	0.3386	KNOWN	3.327	2.146
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.403	0.260
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	0.665	0.429
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.480	0.309
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	7.834	5.054
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	9.026	5.823
94	62	13	16.0	2400.0	50.0	2.0073	KNOWN	0.268	0.173
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.536	0.346
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	0.782	0.504
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	2.524	1.629
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	0.921	0.594
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	4.550	2.935
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	12.640	8.155
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	1.339	0.864
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	8.080	5.213
92	18	61	20.0	1440.0	65.0	0.2500	KNOWN	2.498	1.611
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.289	0.187
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	0.957	0.618
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	0.839	0.541
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.430	0.923
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	2.934	1.893
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.317	0.204
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.020	0.658
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	2.508	1.618
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.018	0.012
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	1.479	0.954
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.501	0.323
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.552	0.356
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.485	0.313
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	1.754	1.132
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.392	0.253
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	1.186	0.765
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.103	0.712
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	1.470	0.949
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	7.792	5.027
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.228	0.147
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.125	3.951
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.868	0.560
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.048	0.676
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.200	0.129
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	4.462	2.879
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.143	0.737
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.584	0.376
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.310	0.200
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	3.533	2.279
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.526	0.339
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.308	0.199
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	1.094	0.706
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	0.692	0.446
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.216	0.140
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.367	0.237
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	1.759	1.135
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.320	0.207
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.190	0.123
76	41	42	36.0	2400.0	70.0	0.0208	KNOWN	0.945	0.609
74	41	56	16.0	3000.0	70.0	1.3464	KNOWN	0.375	0.242
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.012	0.008
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.210	0.136
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	0.736	0.475
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.103	0.711
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.183	0.118
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	0.739	0.477
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	1.148	0.740
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	0.935	0.603
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	0.504	0.325
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.286	0.185
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.171	0.111
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	3.085	1.990
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	3.681	2.375
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.449	0.289
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	2.543	1.641
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	2.985	1.926
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	0.565	0.365
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	2.919	1.883
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	0.975	0.629
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	1.396	0.901
81	58	59	12.0	800.0	45.0	3.3005	KNOWN	0.268	0.173
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.178	0.115
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.706	0.455

TABLE - SHS6

06:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.501	-0.968	KNOWN	251.4		136.4
2	1	3	4	0	60.0	-0.665	-0.429	KNOWN	254.6		194.6
3	3	5	2	18	40.0	-3.497	-2.256	KNOWN	254.4		214.4
4	51	50	52	0	110.0	-3.837	-2.476	KNOWN	250.8		140.8
5	51	53	58	0	140.0	-0.882	-0.569	KNOWN	249.1		109.1
6	4	5	6	11	40.0	-0.511	-0.329	KNOWN	255.3		215.3
7	6	8	7	0	95.0	-0.325	-0.210	KNOWN	256.6		161.6
8	8	10	0	0	30.0	23.188	14.960		257.5	KNOWN	227.5
9	11	7	9	12	80.0	-1.331	-0.858	KNOWN	256.8		176.8
10	9	103	0	0	100.0	8.247	5.320	KNOWN	258.5		158.5
11	14	93	13	0	50.0	-0.681	-0.439	KNOWN	253.2		203.2
12	14	15	34	0	80.0	-0.913	-0.589	KNOWN	255.5		175.5
13	16	50	90	15	125.0	-2.058	-1.328	KNOWN	255.0		130.0
14	17	2	46	0	30.0	-1.331	-0.858	KNOWN	247.8		217.8
15	18	20	0	0	20.0	-0.093	-0.060	KNOWN	253.6		233.6
16	19	20	21	26	20.0	-0.093	-0.060	KNOWN	253.4		233.4
17	21	22	24	23	20.0	-1.160	-0.749	KNOWN	254.0		234.0
18	10	22	92	0	40.0	-0.665	-0.429	KNOWN	256.4		216.4
19	24	25	45	0	20.0	-0.093	-0.060	KNOWN	252.9		232.9
20	26	25	41	0	20.0	-0.356	-0.230	KNOWN	252.9		232.9
21	27	95	28	0	20.0	-0.170	-0.110	KNOWN	251.6		231.6
22	95	29	32	0	20.0	-0.093	-0.060	KNOWN	250.3		230.3
23	28	29	44	0	20.0	-0.712	-0.459	KNOWN	250.1		230.1
24	35	33	0	0	20.0	-1.671	-1.078	KNOWN	241.1		221.1
25	35	37	0	0	20.0	-0.603	-0.389	KNOWN	241.1		221.1
26	37	38	40	42	20.0	-0.248	-0.160	KNOWN	241.6		221.6
27	38	39	0	0	20.0	-1.083	-0.699	KNOWN	240.9		220.9
28	32	33	48	0	25.0	-0.851	-0.549	KNOWN	246.3		221.3
29	40	39	0	0	20.0	-0.124	-0.080	KNOWN	241.3		221.3
30	44	42	43	0	20.0	-1.779	-1.148	KNOWN	249.3		229.3
31	46	48	49	0	40.0	-0.959	-0.619	KNOWN	247.7		207.7
32	52	53	49	54	95.0	-0.743	-0.479	KNOWN	249.6		154.6
33	54	55	56	0	110.0	-2.352	-1.517	KNOWN	246.9		136.9
34	58	55	57	60	75.0	-1.315	-0.848	KNOWN	246.6		171.6
35	56	57	62	61	80.0	-1.315	-0.848	KNOWN	245.5		165.5
36	62	63	75	0	80.0	-1.037	-0.669	KNOWN	245.4		165.4
37	61	63	64	66	75.0	-1.037	-0.669	KNOWN	243.2		168.2
38	64	70	69	65	60.0	-1.176	-0.759	KNOWN	239.1		179.1
39	70	71	73	72	20.0	-0.727	-0.469	KNOWN	241.5		221.5
40	71	68	0	0	20.0	-0.526	-0.339	KNOWN	237.7		217.7
41	75	73	76	74	70.0	-0.743	-0.479	KNOWN	245.4		175.4
42	72	76	77	0	40.0	4.049	2.612		245.6	KNOWN	205.6
43	67	102	0	0	20.0	-0.603	-0.389	KNOWN	238.8		218.8
44	77	78	79	97	50.0	-1.594	-1.028	KNOWN	244.4		194.4
45	78	80	82	0	40.0	1.501	0.968	KNOWN	246.3		206.3
46	79	80	0	0	60.0	-1.779	-1.148	KNOWN	243.3		183.3
47	96	47	83	0	40.0	-1.037	-0.669	KNOWN	248.9		208.9
48	96	85	88	0	70.0	-0.155	-0.100	KNOWN	249.4		179.4
49	85	86	84	0	110.0	-0.155	-0.100	KNOWN	248.6		138.6
50	47	88	31	99	60.0	3.327	2.146	KNOWN	250.4		190.4
51	23	45	41	43	20.0	-8.417	-5.430	KNOWN	252.7		232.7
52	103	34	91	0	80.0	19.067	12.301		257.4	KNOWN	177.4
53	86	0	0	0	120.0	-0.743	-0.479	KNOWN	247.7		127.7
54	87	0	0	0	120.0	-1.625	-1.048	KNOWN	246.0		126.0
55	60	36	0	0	60.0	3.590	2.316	KNOWN	254.4		194.4
56	74	0	0	0	100.0	-0.522	-0.337		245.0	KNOWN	145.0
57	69	68	67	0	25.0	-1.176	-0.759	KNOWN	237.7		212.7
58	12	93	81	0	75.0	-0.232	-0.150	KNOWN	253.8		178.8
59	31	91	81	0	60.0	-0.232	-0.150	KNOWN	253.9		193.9
60	13	0	0	0	40.0	-0.572	-0.369	KNOWN	251.6		211.6
61	30	92	0	0	180.0	-0.511	-0.329	KNOWN	255.6		75.6
62	89	94	0	0	45.0	-0.572	-0.369	KNOWN	254.9		209.9
63	59	99	98	0	100.0	-0.774	-0.499	KNOWN	245.8		145.8
64	97	36	98	0	90.0	-1.114	-0.719	KNOWN	245.8		155.8
65	82	83	84	87	105.0	-1.315	-0.848	KNOWN	247.9		142.9
66	100	66	101	0	60.0	-0.294	-0.190	KNOWN	241.6		181.6
67	65	102	101	0	60.0	-0.294	-0.190	KNOWN	239.0		179.0

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.073	0.692
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.049	0.677
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.622	0.401
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	0.688	0.444
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.426	1.565
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	7.501	4.839
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.883	0.570
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	1.062	0.685
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	2.747	1.772
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.546	0.352
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	15.538	10.025
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	11.155	7.197
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.829	0.535
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.493	0.318
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.649	7.515
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.636	0.410
90	6	13	36.0	5000.0	70.0	0.0432	KNOWN	2.816	1.817
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	1.331	0.859
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.362	0.233
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	8.433	5.441
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	3.541	2.285
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	14.755	9.519
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	6.394	4.125
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.886	0.572
103	10	52	24.0	2400.0	45.0	0.3386	KNOWN	1.853	1.196
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.434	0.280
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	0.819	0.529
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.572	0.369
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	16.037	10.346
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	17.386	11.217
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.211	0.136
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.174	0.112
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	0.969	0.625
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	2.104	1.357
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	1.017	0.656
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	4.710	3.039
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	12.248	7.902
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	1.267	0.818
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	7.717	4.979
92	18	61	20.0	1440.0	65.0	0.2500	KNOWN	1.841	1.188
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.218	0.141
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	0.956	0.617
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	0.879	0.567
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.497	0.966
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	3.043	1.963
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.311	0.201
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.093	0.705
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	2.642	1.705
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.059	0.038
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	1.730	1.116
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.544	0.351
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.636	0.411
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.570	0.368
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	1.999	1.289
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.447	0.288
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	1.488	0.960
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.136	0.733
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	2.273	1.467
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	7.309	4.716
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.128	0.083
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	4.829	3.116
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.779	0.503
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.650	1.065
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.177	0.114
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	2.000	1.291
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.529	0.987
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.764	0.493
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.548	0.353
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	0.419	0.270
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.650	0.419
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.390	0.252
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	1.737	1.121
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	0.897	0.579
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.314	0.203
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.528	0.341
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	2.519	1.625
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.473	0.305
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.006	0.004
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	3.368	2.173
74	41	56	16.0	3000.0	70.0	1.3464	KNOWN	0.522	0.336
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.208	0.134
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.277	0.179
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	0.880	0.568
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.025	0.662
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.478	0.308
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	0.838	0.540
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	1.302	0.840
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	0.826	0.533
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	0.831	0.536
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.435	0.281
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.229	0.148
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	4.434	2.861
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	5.420	3.497
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.743	0.479
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	3.536	2.282
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.137	2.024
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	0.609	0.393
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	3.534	2.280
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	1.625	1.048
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	1.939	1.251
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.165	0.107
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.011	0.007
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.860	0.555

TABLE - SHS7

07:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION CFS	- MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.934	-1.248	KNOWN	243.0		128.0
2	1	3	4	0	60.0	-0.851	-0.549	KNOWN	247.6		187.6
3	3	5	2	18	40.0	-4.518	-2.915	KNOWN	247.3		207.3
4	51	50	52	0	110.0	-4.951	-3.194	KNOWN	242.5		132.5
5	51	53	58	0	140.0	-1.068	-0.689	KNOWN	239.7		99.7
6	4	5	6	11	40.0	-0.650	-0.419	KNOWN	248.8		208.8
7	6	8	7	0	95.0	-0.433	-0.279	KNOWN	249.8		154.8
8	8	10	0	0	30.0	18.797	12.127		250.0	KNOWN	220.0
9	11	7	9	12	80.0	-1.717	-1.108	KNOWN	250.7		170.7
10	9	103	0	0	100.0	9.144	5.899	KNOWN	255.0		155.0
11	14	93	13	0	50.0	-0.851	-0.549	KNOWN	247.5		197.5
12	14	15	34	0	80.0	-1.160	-0.749	KNOWN	250.5		170.5
13	16	50	90	15	125.0	-2.584	-1.667	KNOWN	249.2		124.2
14	17	2	46	0	30.0	-1.717	-1.108	KNOWN	237.6		207.6
15	18	20	0	0	20.0	-0.108	-0.070	KNOWN	245.6		225.6
16	19	20	21	26	20.0	-0.108	-0.070	KNOWN	245.3		225.3
17	21	22	24	23	20.0	-1.501	-0.968	KNOWN	245.7		225.7
18	10	22	92	0	40.0	-0.851	-0.549	KNOWN	248.8		208.8
19	24	25	45	0	20.0	-0.108	-0.070	KNOWN	244.3		224.3
20	26	25	41	0	20.0	-0.433	-0.279	KNOWN	244.3		224.3
21	27	95	28	0	20.0	-0.217	-0.140	KNOWN	242.7		222.7
22	95	29	32	0	20.0	-0.108	-0.070	KNOWN	240.9		220.9
23	28	29	44	0	20.0	-0.866	-0.559	KNOWN	240.6		220.6
24	35	33	0	0	20.0	-2.011	-1.298	KNOWN	228.3		208.3
25	35	37	0	0	20.0	-0.712	-0.459	KNOWN	228.3		208.3
26	37	38	40	42	20.0	-0.279	-0.180	KNOWN	228.9		208.9
27	38	39	0	0	20.0	-1.300	-0.838	KNOWN	228.0		208.0
28	32	33	48	0	25.0	-1.006	-0.649	KNOWN	235.7		210.7
29	40	39	0	0	20.0	-0.139	-0.090	KNOWN	228.6		208.6
30	44	42	43	0	20.0	-2.166	-1.397	KNOWN	239.5		219.5
31	46	48	49	0	40.0	-1.160	-0.749	KNOWN	237.6		197.6
32	52	53	49	54	95.0	-0.882	-0.569	KNOWN	240.5		145.5
33	54	55	56	0	110.0	-2.862	-1.847	KNOWN	235.9		125.9
34	58	55	57	60	75.0	-1.609	-1.038	KNOWN	235.5		160.5
35	56	57	62	61	80.0	-1.609	-1.038	KNOWN	233.5		153.5
36	62	63	75	0	80.0	-1.253	-0.809	KNOWN	233.1		153.1
37	61	63	64	66	75.0	-1.253	-0.809	KNOWN	230.0		155.0
38	64	70	69	65	60.0	-1.439	-0.928	KNOWN	224.0		164.0
39	70	71	73	72	20.0	-0.851	-0.549	KNOWN	227.5		207.5
40	71	68	0	0	20.0	-0.650	-0.419	KNOWN	222.0		202.0
41	75	73	76	74	70.0	-0.882	-0.569	KNOWN	233.0		163.0
42	72	76	77	0	40.0	0.713	0.460		233.0	KNOWN	193.0
43	67	102	0	0	20.0	-0.712	-0.459	KNOWN	223.6		203.6
44	77	78	79	97	50.0	-1.950	-1.258	KNOWN	232.4		182.4
45	78	80	82	0	40.0	1.393	0.898	KNOWN	235.3		195.3
46	79	80	0	0	60.0	-2.182	-1.407	KNOWN	230.9		170.9
47	96	47	83	0	40.0	-1.253	-0.809	KNOWN	241.8		201.8
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	242.5		172.5
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	241.2		131.2
50	47	88	31	99	60.0	4.518	2.915	KNOWN	244.1		184.1
51	23	45	41	43	20.0	-10.305	-6.648	KNOWN	243.9		223.9
52	103	34	91	0	80.0	35.673	23.015		255.6	KNOWN	175.6
53	86	0	0	0	120.0	-0.882	-0.569	KNOWN	239.9		119.9
54	87	0	0	0	120.0	-1.965	-1.268	KNOWN	237.2		117.2
55	60	36	0	0	60.0	4.456	2.875	KNOWN	247.4		187.4
56	74	0	0	0	100.0	2.436	1.571		240.0	KNOWN	140.0
57	69	68	67	0	25.0	-1.439	-0.928	KNOWN	222.0		197.0
58	12	93	81	0	75.0	-0.279	-0.180	KNOWN	248.4		173.4
59	31	91	81	0	60.0	-0.279	-0.180	KNOWN	249.5		189.5
60	13	0	0	0	40.0	-0.712	-0.459	KNOWN	245.1		205.1
61	30	92	0	0	180.0	-0.650	-0.419	KNOWN	248.8		68.8
62	89	94	0	0	45.0	-0.712	-0.459	KNOWN	248.6		203.6
63	59	99	98	0	100.0	-0.959	-0.619	KNOWN	234.9		134.9
64	97	36	98	0	90.0	-1.362	-0.878	KNOWN	234.8		144.8
65	82	83	84	87	105.0	-1.609	-1.038	KNOWN	239.9		134.9
66	100	66	101	0	60.0	-0.356	-0.230	KNOWN	227.7		167.7
67	65	102	101	0	60.0	-0.356	-0.230	KNOWN	223.9		163.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.306	0.843
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.399	0.903
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.772	0.498
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.018	0.657
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.176	2.049
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	10.094	6.512
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.080	0.697
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	1.535	0.990
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	3.979	2.567
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.697	0.450
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	20.083	12.957
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	14.435	9.313
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	1.026	0.662
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.656	0.423
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	10.474	6.758
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.729	0.470
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	3.243	2.092
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	0.308	0.199
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.219	0.141
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	3.563	2.299
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	7.345	4.739
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	15.235	9.829
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	10.566	6.817
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.774	0.500
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	1.422	0.917
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.511	0.329
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.052	0.679
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.712	0.459
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	27.802	17.937
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	29.473	19.015
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.493	0.318
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.134	0.087
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	1.427	0.920
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.822	1.176
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	1.446	0.933
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	5.673	3.660
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	14.042	9.059
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	1.491	0.962
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	9.228	5.954
92	18	61	20.0	1440.0	65.0	0.2500	KNOWN	0.342	0.220
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.160	0.103
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	1.222	0.789
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	1.173	0.757
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.785	1.152
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	3.672	2.369
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.402	0.260
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.274	0.822
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	3.208	2.070
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.068	0.044
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.079	1.342
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.644	0.415
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.762	0.492
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.677	0.437
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.361	1.523
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.538	0.347
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	1.811	1.168
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.319	0.851
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	2.837	1.830
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	9.689	6.251
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.150	0.097
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.677	4.308
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	1.115	0.719
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.072	1.337
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.154	0.099
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	3.375	2.177
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.873	1.209
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.934	0.603
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.653	0.421
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	1.468	0.947
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.797	0.514
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.477	0.308
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.101	1.355
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.103	0.711
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.356	0.230
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.643	0.415
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.038	1.960
72	42	39	12.0	4000.0	50.0	16.2962	KNOWN	0.556	0.359
68	57	40	16.0	2000.0	60.0	1.1930	KNOWN	0.007	0.005
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	0.024	0.016
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	2.436	1.571
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.140	0.090
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.344	0.222
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.055	0.681
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.279	0.825
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.577	0.372
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.107	0.714
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	1.605	1.035
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.492	0.962
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.014	0.654
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.554	0.357
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.315	0.203
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	5.819	3.754
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.018	4.528
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.882	0.569
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	4.751	3.065
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.944	2.545
99	58	63	12.0	8000.0	80.0	11.3845	KNOWN	0.890	0.574
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	4.779	3.083
87	65	54	20.0	16000.0	130.0	0.7787	KNOWN	1.965	1.268
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.384	1.538
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.556	0.359
98	63	64	12.0	2400.0	50.0	0.1481	KNOWN	0.084	0.054
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.055	0.681

TABLE - SHS8

08:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION CFS	- MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.950	-1.258	KNOWN	241.8		126.8
2	1	3	4	0	60.0	-0.866	-0.559	KNOWN	246.5		186.5
3	3	5	2	18	40.0	-4.533	-2.925	KNOWN	246.1		206.1
4	51	50	52	0	110.0	-4.967	-3.204	KNOWN	241.5		131.5
5	51	53	58	0	140.0	-1.145	-0.739	KNOWN	238.8		98.8
6	4	5	6	11	40.0	-0.650	-0.419	KNOWN	247.8		207.8
7	6	8	7	0	95.0	-0.433	-0.279	KNOWN	249.0		154.0
8	8	10	0	0	30.0	20.811	13.426		249.2	KNOWN	219.2
9	11	7	9	12	80.0	-1.733	-1.118	KNOWN	249.9		169.9
10	9	103	0	0	100.0	9.438	6.089	KNOWN	254.4		154.4
11	14	93	13	0	50.0	-0.913	-0.589	KNOWN	248.3		198.3
12	14	15	34	0	80.0	-1.222	-0.789	KNOWN	249.7		169.7
13	16	50	90	15	125.0	-2.739	-1.767	KNOWN	248.3		123.3
14	17	2	46	0	30.0	-1.733	-1.118	KNOWN	238.8		208.8
15	18	20	0	0	20.0	-0.124	-0.080	KNOWN	243.9		223.9
16	19	20	21	26	20.0	-0.124	-0.080	KNOWN	243.6		223.6
17	21	22	24	23	20.0	-1.501	-0.968	KNOWN	244.0		224.0
18	10	22	92	0	40.0	-0.866	-0.559	KNOWN	247.8		207.8
19	24	25	45	0	20.0	-0.124	-0.080	KNOWN	242.2		222.2
20	26	25	41	0	20.0	-0.511	-0.329	KNOWN	242.1		222.1
21	27	95	28	0	20.0	-0.263	-0.170	KNOWN	240.5		220.5
22	95	29	32	0	20.0	-0.124	-0.080	KNOWN	238.4		218.4
23	28	29	44	0	20.0	-1.006	-0.649	KNOWN	237.8		217.8
24	35	33	0	0	20.0	-2.182	-1.407	KNOWN	224.2		204.2
25	35	37	0	0	20.0	-0.774	-0.499	KNOWN	224.1		204.1
26	37	38	40	42	20.0	-0.309	-0.200	KNOWN	224.7		204.7
27	38	39	0	0	20.0	-1.408	-0.908	KNOWN	223.7		203.7
28	32	33	48	0	25.0	-1.099	-0.709	KNOWN	233.2		208.2
29	40	39	0	0	20.0	-0.155	-0.100	KNOWN	224.3		204.3
30	44	42	43	0	20.0	-2.522	-1.627	KNOWN	236.5		216.5
31	46	48	49	0	40.0	-1.253	-0.809	KNOWN	235.8		195.8
32	52	53	49	54	95.0	-0.944	-0.609	KNOWN	239.6		144.6
33	54	55	56	0	110.0	-3.064	-1.976	KNOWN	235.3		125.3
34	58	55	57	60	75.0	-1.717	-1.108	KNOWN	235.4		160.4
35	56	57	62	61	80.0	-1.717	-1.108	KNOWN	233.2		153.2
36	62	63	75	0	80.0	-1.331	-0.858	KNOWN	232.9		152.9
37	61	63	64	66	75.0	-1.331	-0.858	KNOWN	229.3		154.3
38	64	70	69	65	60.0	-1.532	-0.988	KNOWN	222.3		162.3
39	70	71	73	72	20.0	-0.944	-0.609	KNOWN	226.4		206.4
40	71	68	0	0	20.0	-0.758	-0.489	KNOWN	220.0		200.0
41	75	73	76	74	70.0	-0.944	-0.609	KNOWN	232.9		162.9
42	72	76	77	0	40.0	3.206	2.068		233.0	KNOWN	193.0
43	67	102	0	0	20.0	-0.774	-0.499	KNOWN	221.9		201.9
44	77	78	79	97	50.0	-2.274	-1.467	KNOWN	230.8		180.8
45	78	80	82	0	40.0	1.857	1.198	KNOWN	234.3		194.3
46	79	80	0	0	60.0	-2.692	-1.737	KNOWN	228.1		168.1
47	96	47	83	0	40.0	-1.331	-0.858	KNOWN	241.0		201.0
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	241.7		171.7
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	240.3		130.3
50	47	88	31	99	60.0	4.967	3.204	KNOWN	243.5		183.5
51	23	45	41	43	20.0	-12.006	-7.746	KNOWN	241.7		221.7
52	103	34	91	0	80.0	36.447	23.514		255.0	KNOWN	175.0
53	86	0	0	0	120.0	-0.944	-0.609	KNOWN	238.9		118.9
54	87	0	0	0	120.0	-2.104	-1.358	KNOWN	235.9		115.9
55	60	36	0	0	60.0	5.678	3.663	KNOWN	253.9		193.9
56	74	0	0	0	100.0	1.270	0.820		235.0	KNOWN	135.0
57	69	68	67	0	25.0	-1.532	-0.988	KNOWN	220.0		195.0
58	12	93	81	0	75.0	-0.294	-0.190	KNOWN	247.3		172.3
59	31	91	81	0	60.0	-0.294	-0.190	KNOWN	248.8		188.8
60	13	0	0	0	40.0	-0.774	-0.499	KNOWN	243.5		203.5
61	30	92	0	0	180.0	-0.650	-0.419	KNOWN	247.7		67.7
62	89	94	0	0	45.0	-0.774	-0.499	KNOWN	247.6		202.6
63	59	99	98	0	100.0	-1.176	-0.759	KNOWN	234.1		134.1
64	97	36	98	0	90.0	-1.686	-1.088	KNOWN	234.1		144.1
65	82	83	84	87	105.0	-1.717	-1.108	KNOWN	238.9		133.9
66	100	66	101	0	60.0	-0.387	-0.250	KNOWN	226.6		166.6
67	65	102	101	0	60.0	-0.387	-0.250	KNOWN	222.3		162.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.322	0.853
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.436	0.926
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.808	0.521
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.154	0.745
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.342	2.156
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	10.832	6.988
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.109	0.715
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	1.766	1.139
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	4.578	2.954
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.698	0.450
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	20.122	12.982
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	14.458	9.327
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	1.028	0.663
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.580	0.375
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.166	7.204
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.764	0.493
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	3.613	2.331
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	0.488	0.315
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.232	0.150
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	4.055	2.616
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	7.544	4.867
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	16.756	10.810
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	10.850	7.000
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.809	0.522
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	1.412	0.911
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.539	0.348
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.148	0.740
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.774	0.499
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	28.458	18.359
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	30.212	19.491
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.542	0.350
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.184	0.118
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	1.642	1.059
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.880	1.213
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	1.724	1.112
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	6.252	4.034
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	15.727	10.146
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	1.712	1.105
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	10.634	6.860
92	18	61	20.0	1440.0	65.0	0.2500	KNOWN	0.162	0.105
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.162	0.105
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	1.426	0.920
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	1.376	0.888
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.913	1.234
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	4.076	2.630
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.524	0.338
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.265	0.816
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	3.595	2.319
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.143	0.093
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.325	1.500
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.630	0.407
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.826	0.533
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.737	0.475
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.502	1.614
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.582	0.375
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.159	1.393
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.429	0.922
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.229	2.083
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	9.237	5.978
55	34	33	12.0	4800.0	60.0	11.6306	KNOWN	0.083	0.054
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.277	4.050
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	1.173	0.757
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.631	1.697
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.237	0.153
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	2.732	1.762
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.997	1.288
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.004	0.648
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.713	0.460
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	0.686	0.443
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.861	0.555
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.519	0.335
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.283	1.473
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.211	0.781
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.402	0.259
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.702	0.453
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.317	2.140
72	42	39	12.0	4000.0	50.0	16.2962	KNOWN	0.612	0.395
68	57	40	16.0	2000.0	60.0	1.1930	KNOWN	0.057	0.036
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	2.301	1.485
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	1.270	0.820
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.291	0.188
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.377	0.244
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.151	0.743
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.430	0.922
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.771	0.497
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.324	0.854
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	1.921	1.240
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.494	0.964
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.076	0.694
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.584	0.377
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.329	0.212
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.116	3.946
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.378	4.760
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.944	0.609
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	4.987	3.217
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.897	2.514
99	58	63	12.0	8000.0	80.0	11.3845	KNOWN	0.902	0.582
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	4.823	3.112
87	65	54	20.0	16000.0	130.0	0.7787	KNOWN	2.104	1.358
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.048	1.966
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.633	0.408
98	64	63	12.0	2400.0	50.0	0.1481	KNOWN	0.037	0.024
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.136	0.733

TABLE - SH89

09:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.810	-1.168	KNOWN	239.5		124.5
2	1	3	4	0	60.0	-0.805	-0.519	KNOWN	243.7		183.7
3	3	5	2	18	40.0	-4.239	-2.735	KNOWN	242.9		202.9
4	51	50	52	0	110.0	-4.657	-3.005	KNOWN	239.8		129.8
5	51	53	54	0	140.0	-1.176	-0.759	KNOWN	235.9		95.9
6	4	5	6	11	40.0	-0.603	-0.389	KNOWN	245.0		205.0
7	6	8	7	0	95.0	-0.402	-0.260	KNOWN	246.1		151.1
8	8	10	0	0	30.0	20.669	13.335		246.2	KNOWN	216.2
9	11	7	9	12	80.0	-1.628	-1.048	KNOWN	247.4		167.4
10	9	103	0	0	100.0	9.887	6.379	KNOWN	253.0		153.0
11	14	93	13	0	50.0	-0.975	-0.629	KNOWN	244.2		194.2
12	14	15	34	0	80.0	-1.300	-0.838	KNOWN	248.0		168.0
13	16	50	90	15	125.0	-2.940	-1.897	KNOWN	246.2		121.2
14	17	2	46	0	30.0	-1.625	-1.048	KNOWN	232.2		202.2
15	18	20	0	0	20.0	-0.170	-0.110	KNOWN	239.4		219.4
16	19	20	21	26	20.0	-0.170	-0.110	KNOWN	239.0		219.0
17	21	22	24	23	20.0	-1.408	-0.908	KNOWN	239.4		219.4
18	10	22	92	0	40.0	-0.805	-0.519	KNOWN	244.5		204.5
19	24	25	45	0	20.0	-0.170	-0.110	KNOWN	236.7		216.7
20	26	25	41	0	20.0	-0.634	-0.409	KNOWN	236.7		216.7
21	27	95	28	0	20.0	-0.309	-0.200	KNOWN	234.8		214.8
22	95	29	32	0	20.0	-0.170	-0.110	KNOWN	232.2		212.2
23	28	29	44	0	20.0	-1.269	-0.819	KNOWN	231.1		211.1
24	35	33	0	0	20.0	-2.537	-1.637	KNOWN	214.2		194.2
25	35	37	0	0	20.0	-0.913	-0.589	KNOWN	214.0		194.0
26	37	38	40	42	20.0	-0.356	-0.230	KNOWN	214.6		194.6
27	38	39	0	0	20.0	-1.640	-1.058	KNOWN	213.2		193.2
28	32	33	48	0	25.0	-1.269	-0.819	KNOWN	227.2		202.2
29	40	39	0	0	20.0	-0.186	-0.120	KNOWN	214.1		194.1
30	44	42	43	0	20.0	-3.187	-2.056	KNOWN	229.2		209.2
31	46	48	49	0	40.0	-1.454	-0.938	KNOWN	231.5		191.5
32	52	53	49	54	95.0	-0.975	-0.629	KNOWN	236.8		141.8
33	54	55	56	0	110.0	-3.125	-2.016	KNOWN	232.3		122.3
34	58	55	57	60	75.0	-1.748	-1.128	KNOWN	232.0		157.0
35	56	57	62	61	80.0	-1.748	-1.128	KNOWN	230.1		150.1
36	62	63	75	0	80.0	-1.362	-0.878	KNOWN	229.9		149.9
37	61	63	64	66	75.0	-1.362	-0.878	KNOWN	225.8		150.8
38	64	70	69	65	60.0	-1.563	-1.008	KNOWN	217.6		157.6
39	70	71	73	72	20.0	-1.099	-0.709	KNOWN	222.2		202.2
40	71	68	0	0	20.0	-0.959	-0.619	KNOWN	214.7		194.7
41	75	73	76	74	70.0	-0.975	-0.629	KNOWN	229.9		159.9
42	72	76	77	0	40.0	3.851	2.485		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-0.913	-0.589	KNOWN	217.0		197.0
44	77	78	79	97	50.0	-2.862	-1.847	KNOWN	225.6		175.6
45	78	80	82	0	40.0	2.568	1.657	KNOWN	231.8		191.8
46	79	80	0	0	60.0	-3.048	-1.966	KNOWN	223.0		163.0
47	96	47	83	0	40.0	-1.362	-0.878	KNOWN	239.5		199.5
48	96	85	88	0	70.0	-0.201	-0.130	KNOWN	240.3		170.3
49	85	86	84	0	110.0	-0.201	-0.130	KNOWN	238.8		128.8
50	47	88	31	99	60.0	5.400	3.484	KNOWN	242.2		182.2
51	23	45	41	43	20.0	-15.101	-9.743	KNOWN	235.9		215.9
52	103	34	91	0	80.0	41.395	26.706		254.6	KNOWN	174.6
53	86	0	0	0	120.0	-0.975	-0.629	KNOWN	237.2		117.2
54	87	0	0	0	120.0	-2.151	-1.388	KNOWN	234.1		114.1
55	60	36	0	0	60.0	5.508	3.554	KNOWN	248.4		188.4
56	74	0	0	0	100.0	1.467	0.946		232.6	KNOWN	132.6
57	69	68	67	0	25.0	-1.563	-1.008	KNOWN	214.7		189.7
58	12	93	81	0	75.0	-0.325	-0.210	KNOWN	245.4		170.4
59	31	91	81	0	60.0	-0.325	-0.210	KNOWN	247.6		187.6
60	13	0	0	0	40.0	-0.820	-0.529	KNOWN	241.1		201.1
61	30	92	0	0	180.0	-0.603	-0.389	KNOWN	244.7		64.7
62	89	94	0	0	45.0	-0.820	-0.529	KNOWN	245.0		200.0
63	59	99	98	0	100.0	-1.331	-0.858	KNOWN	228.9		128.9
64	97	36	98	0	90.0	-1.903	-1.228	KNOWN	228.7		138.7
65	82	83	84	87	105.0	-1.748	-1.128	KNOWN	237.3		132.3
66	100	66	101	0	60.0	-0.387	-0.250	KNOWN	222.6		162.6
67	65	102	101	0	60.0	-0.387	-0.250	KNOWN	217.5		157.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.242	0.801
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.476	0.952
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.907	0.585
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.459	0.941
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.505	2.261
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	12.037	7.766
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.147	0.740
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.258	1.457
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	5.851	3.775
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.741	0.478
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	20.885	13.474
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	15.488	9.992
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	1.066	0.688
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.631	0.407
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	10.842	6.995
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.823	0.531
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	6.016	3.882
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.479	0.954
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.058	0.037
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	2.206	1.423
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	9.039	5.832
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	18.463	11.911
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	12.210	7.878
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.724	0.467
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	2.324	1.499
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.575	0.371
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.219	0.787
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.820	0.529
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	32.079	20.696
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	33.954	21.906
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.762	0.492
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.430	0.277
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.088	1.347
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.827	1.178
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.249	1.451
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	7.346	4.740
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	18.533	11.957
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.113	1.363
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	13.186	8.507
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	0.875	0.565
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.140	0.090
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	1.802	1.163
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	1.754	1.132
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.161	1.394
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	4.876	3.146
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.746	0.481
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.245	0.803
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.353	2.809
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.287	0.185
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.824	1.822
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.626	0.404
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.963	0.622
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.862	0.556
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.808	1.811
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.677	0.437
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.848	1.838
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.642	1.059
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.873	2.499
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	9.574	6.177
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.117	0.075
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.332	4.085
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	1.086	0.701
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.465	1.591
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.378	0.244
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	2.494	1.609
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.105	1.358
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.071	0.691
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.759	0.489
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	0.373	0.241
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.940	0.606
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.562	0.363
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.435	1.571
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.345	0.867
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.468	0.302
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.763	0.492
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.626	2.340
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.670	0.432
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.197	0.127
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	2.761	1.781
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	1.467	0.946
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.420	0.271
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.415	0.268
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.328	0.857
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.917	1.237
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.749	0.483
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.274	0.822
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.299	1.483
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.648	1.063
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.102	0.711
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.605	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.345	0.223
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.377	4.114
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.680	4.955
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.975	0.629
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.201	3.356
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.973	2.563
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.087	0.701
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.117	3.301
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.151	1.388
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.043	1.963
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.820	0.529
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.134	0.087
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.247	0.804

TABLE - SH810

10:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.841	-1.188	KNOWN	237.3		122.3
2	1	3	4	0	60.0	-0.820	-0.529	KNOWN	241.4		181.4
3	3	5	2	18	40.0	-4.286	-2.765	KNOWN	240.6		200.6
4	51	50	52	0	110.0	-4.704	-3.035	KNOWN	237.7		127.7
5	51	53	54	0	140.0	-1.160	-0.749	KNOWN	234.7		94.7
6	4	5	6	11	40.0	-0.603	-0.389	KNOWN	242.9		202.9
7	6	8	7	0	95.0	-0.418	-0.270	KNOWN	244.0		149.0
8	8	10	0	0	30.0	21.221	13.691		244.0	KNOWN	214.0
9	11	7	9	12	80.0	-1.640	-1.058	KNOWN	249.4		169.4
10	9	103	0	0	100.0	9.856	6.359	KNOWN	291.9		191.9
11	14	93	13	0	50.0	-1.145	-0.739	KNOWN	241.8		191.8
12	14	15	34	0	80.0	-1.532	-0.988	KNOWN	246.7		166.7
13	16	50	90	15	125.0	-3.435	-2.216	KNOWN	244.7		119.7
14	17	2	46	0	30.0	-1.640	-1.058	KNOWN	229.6		199.6
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	236.3		216.3
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	235.7		215.7
17	21	22	24	23	20.0	-1.439	-0.928	KNOWN	236.1		216.1
18	10	22	92	0	40.0	-0.820	-0.529	KNOWN	242.0		202.0
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	232.8		212.8
20	26	25	41	0	20.0	-0.696	-0.449	KNOWN	232.8		212.8
21	27	95	28	0	20.0	-0.356	-0.230	KNOWN	230.9		210.9
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	228.1		208.1
23	28	29	44	0	20.0	-1.423	-0.918	KNOWN	226.6		206.4
24	35	33	0	0	20.0	-2.723	-1.757	KNOWN	208.2		188.2
25	35	37	0	0	20.0	-0.959	-0.619	KNOWN	208.0		188.0
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	208.5		188.5
27	38	39	0	0	20.0	-1.748	-1.128	KNOWN	207.0		187.0
28	32	33	48	0	25.0	-1.362	-0.878	KNOWN	223.4		198.4
29	40	39	0	0	20.0	-0.201	-0.130	KNOWN	207.9		187.9
30	44	42	43	0	20.0	-3.543	-2.286	KNOWN	224.4		204.4
31	46	48	49	0	40.0	-1.563	-1.008	KNOWN	229.0		189.0
32	52	53	49	54	95.0	-0.959	-0.619	KNOWN	235.5		140.5
33	54	55	56	0	110.0	-3.094	-1.996	KNOWN	231.6		121.6
34	58	55	57	60	75.0	-1.748	-1.128	KNOWN	231.4		156.4
35	56	57	62	61	80.0	-1.748	-1.128	KNOWN	229.8		149.8
36	62	63	75	0	80.0	-1.362	-0.878	KNOWN	229.7		149.7
37	61	63	64	66	75.0	-1.362	-0.878	KNOWN	225.4		150.4
38	64	70	69	65	60.0	-1.563	-1.008	KNOWN	216.8		156.8
39	70	71	73	72	20.0	-1.160	-0.749	KNOWN	221.6		201.6
40	71	68	0	0	20.0	-1.068	-0.689	KNOWN	213.5		193.5
41	75	73	76	74	70.0	-0.959	-0.619	KNOWN	229.7		159.7
42	72	76	77	0	40.0	5.383	3.473		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-0.959	-0.619	KNOWN	216.1		196.1
44	77	78	79	97	50.0	-3.187	-2.056	KNOWN	222.8		172.8
45	78	80	82	0	40.0	2.429	1.567	KNOWN	229.4		189.4
46	79	80	0	0	60.0	-3.141	-2.026	KNOWN	220.2		160.2
47	96	47	83	0	40.0	-1.362	-0.878	KNOWN	239.1		199.1
48	96	85	88	0	70.0	-0.201	-0.130	KNOWN	239.8		169.8
49	85	86	84	0	110.0	-0.201	-0.130	KNOWN	238.3		128.3
50	47	88	31	99	60.0	5.879	3.793	KNOWN	241.9		181.9
51	23	45	41	43	20.0	-16.834	-10.861	KNOWN	231.9		211.9
52	103	34	91	0	80.0	44.419	28.657		254.1	KNOWN	174.1
53	86	0	0	0	120.0	-0.959	-0.619	KNOWN	236.7		116.7
54	87	0	0	0	120.0	-2.135	-1.378	KNOWN	233.5		113.5
55	60	36	0	0	60.0	5.709	3.683	KNOWN	248.4		188.4
56	74	0	0	0	100.0	1.017	0.656		231.1	KNOWN	131.1
57	69	68	67	0	25.0	-1.563	-1.008	KNOWN	213.6		188.6
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	243.2		168.2
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	246.8		186.8
60	13	0	0	0	40.0	-0.959	-0.619	KNOWN	237.4		197.4
61	30	92	0	0	180.0	-0.603	-0.389	KNOWN	242.4		62.4
62	89	94	0	0	45.0	-0.959	-0.619	KNOWN	242.9		197.9
63	59	99	98	0	100.0	-1.377	-0.888	KNOWN	227.2		127.2
64	97	36	98	0	90.0	-1.965	-1.268	KNOWN	226.8		136.8
65	82	83	84	87	105.0	-1.748	-1.128	KNOWN	236.8		131.8
66	100	66	101	0	60.0	-0.387	-0.250	KNOWN	222.1		162.1
67	65	102	101	0	60.0	-0.387	-0.250	KNOWN	216.7		156.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.227	0.792
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.546	0.998
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.932	0.602
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.617	1.043
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.664	2.364
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	12.851	8.291
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.155	0.745
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.514	1.622
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	6.514	4.202
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.720	0.465
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	20.616	13.301
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	15.192	9.801
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	1.015	0.655
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.575	0.371
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	10.639	6.864
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.844	0.545
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	7.459	4.812
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.805	1.164
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.013	0.008
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	1.456	0.939
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	9.601	6.194
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	19.765	12.751
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	12.844	8.286
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.759	0.490
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	2.988	1.928
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.671	0.433
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.433	0.925
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.959	0.619
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	33.996	21.933
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	36.199	23.354
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.939	0.606
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.447	0.288
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.328	1.502
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.779	1.148
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.531	1.633
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	7.904	5.099
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	20.146	12.997
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.332	1.504
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	14.596	9.417
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.201	0.775
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.131	0.085
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.015	1.300
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	1.966	1.268
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.260	1.458
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.288	3.412
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.876	0.565
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.198	0.773
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.741	3.059
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.355	0.229
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.078	1.986
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.605	0.390
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.028	0.663
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.922	0.595
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.941	1.897
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.721	0.465
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.241	2.091
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.743	1.125
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	4.357	2.811
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	8.861	5.717
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.091	0.059
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	5.676	3.662
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.987	0.637
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.512	1.621
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.442	0.285
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	1.691	1.091
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.131	1.375
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.093	0.705
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.779	0.502
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	0.450	0.290
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.969	0.625
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.579	0.374
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.495	1.610
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.407	0.907
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.494	0.319
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.790	0.510
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.747	2.417
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.699	0.451
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.277	0.179
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	4.139	2.670
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	1.017	0.656
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.545	0.351
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.433	0.280
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.393	0.899
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.973	1.273
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.773	0.499
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.443	0.931
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.367	1.527
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.912	1.233
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.107	0.714
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.618	0.399
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.363	0.234
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.592	4.253
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.900	5.097
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.959	0.619
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.432	3.505
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.784	2.441
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.145	0.739
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.232	3.375
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.135	1.378
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.197	2.063
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	1.061	0.685
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.210	0.136
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.285	0.829

TABLE - SHS11

11:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.042	-1.318	KNOWN	235.3		120.3
2	1	3	4	0	60.0	-0.913	-0.589	KNOWN	239.8		179.8
3	3	5	2	18	40.0	-4.781	-3.084	KNOWN	238.8		198.8
4	51	50	52	0	110.0	-5.230	-3.374	KNOWN	236.8		126.8
5	51	53	58	0	140.0	-1.099	-0.709	KNOWN	234.1		94.1
6	4	5	6	11	40.0	-0.681	-0.439	KNOWN	241.4		201.4
7	6	8	7	0	95.0	-0.449	-0.289	KNOWN	242.5		147.5
8	8	10	0	0	30.0	21.410	13.813		242.5	KNOWN	212.5
9	11	7	9	12	80.0	-1.826	-1.178	KNOWN	244.1		164.1
10	9	103	0	0	100.0	9.871	6.369	KNOWN	250.6		150.6
11	14	93	13	0	50.0	-1.145	-0.739	KNOWN	240.9		190.9
12	14	15	34	0	80.0	-1.516	-0.978	KNOWN	246.0		166.0
13	16	50	90	15	125.0	-3.419	-2.206	KNOWN	243.8		118.8
14	17	2	46	0	30.0	-1.826	-1.178	KNOWN	227.7		197.7
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	234.3		214.3
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	233.7		213.7
17	21	22	24	23	20.0	-1.594	-1.028	KNOWN	234.1		214.1
18	10	22	92	0	40.0	-0.913	-0.589	KNOWN	240.4		200.4
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	230.6		210.6
20	26	25	41	0	20.0	-0.743	-0.479	KNOWN	230.6		210.6
21	27	95	28	0	20.0	-0.371	-0.240	KNOWN	228.8		208.8
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	225.9		205.9
23	28	29	44	0	20.0	-1.470	-0.948	KNOWN	224.4		204.4
24	35	33	0	0	20.0	-2.723	-1.757	KNOWN	206.1		186.1
25	35	37	0	0	20.0	-0.975	-0.629	KNOWN	205.8		185.8
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	206.3		186.3
27	38	39	0	0	20.0	-1.748	-1.128	KNOWN	204.8		184.8
28	32	33	48	0	25.0	-1.362	-0.878	KNOWN	221.6		196.6
29	40	39	0	0	20.0	-0.201	-0.130	KNOWN	205.7		185.7
30	44	42	43	0	20.0	-3.682	-2.376	KNOWN	222.0		202.0
31	46	48	49	0	40.0	-1.563	-1.008	KNOWN	227.5		187.5
32	52	53	49	54	95.0	-0.913	-0.589	KNOWN	234.8		139.8
33	54	55	56	0	110.0	-2.940	-1.897	KNOWN	231.3		121.3
34	58	55	57	60	75.0	-1.656	-1.068	KNOWN	231.4		156.4
35	56	57	62	61	80.0	-1.656	-1.068	KNOWN	229.7		149.7
36	62	63	75	0	80.0	-1.284	-0.829	KNOWN	229.7		149.7
37	61	63	64	66	75.0	-1.284	-0.829	KNOWN	225.7		150.7
38	64	70	69	65	60.0	-1.470	-0.948	KNOWN	217.4		157.4
39	70	71	73	72	20.0	-1.176	-0.759	KNOWN	221.9		201.9
40	71	68	0	0	20.0	-1.099	-0.709	KNOWN	214.2		194.2
41	75	73	76	74	70.0	-0.913	-0.589	KNOWN	229.7		159.7
42	72	76	77	0	40.0	5.737	3.701		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-0.975	-0.629	KNOWN	216.7		196.7
44	77	78	79	97	50.0	-3.311	-2.136	KNOWN	222.3		172.3
45	78	80	82	0	40.0	2.243	1.447	KNOWN	228.9		188.9
46	79	80	0	0	60.0	-3.187	-2.056	KNOWN	219.5		159.5
47	96	47	83	0	40.0	-1.284	-0.829	KNOWN	240.4		200.4
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	241.0		171.0
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	239.5		129.5
50	47	88	31	99	60.0	6.142	3.963	KNOWN	243.0		183.0
51	23	45	41	43	20.0	-17.484	-11.280	KNOWN	229.6		209.6
52	103	34	91	0	80.0	46.051	29.710		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.913	-0.589	KNOWN	238.1		118.1
54	87	0	0	0	120.0	-2.027	-1.308	KNOWN	235.0		115.0
55	60	36	0	0	60.0	5.972	3.853	KNOWN	250.1		190.1
56	74	0	0	0	100.0	0.543	0.350		230.1	KNOWN	130.1
57	69	68	67	0	25.0	-1.470	-0.948	KNOWN	214.3		189.3
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	242.5		167.5
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	247.2		187.2
60	13	0	0	0	40.0	-0.959	-0.619	KNOWN	236.8		196.8
61	30	92	0	0	180.0	-0.681	-0.439	KNOWN	240.8		60.8
62	89	94	0	0	45.0	-0.959	-0.619	KNOWN	241.5		196.5
63	59	99	98	0	100.0	-1.393	-0.898	KNOWN	227.4		127.4
64	97	36	98	0	90.0	-1.996	-1.288	KNOWN	226.9		136.9
65	82	83	84	87	105.0	-1.656	-1.068	KNOWN	237.9		132.9
66	100	66	101	0	60.0	-0.371	-0.240	KNOWN	222.4		162.4
67	65	102	101	0	60.0	-0.371	-0.240	KNOWN	217.3		157.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.293	0.834
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.673	1.080
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.924	0.596
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.688	1.089
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.894	2.512
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	13.570	8.755
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.167	0.753
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.592	1.672
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	6.718	4.335
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.686	0.442
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	20.597	13.288
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	14.682	9.472
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.927	0.598
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.514	0.331
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	10.517	6.785
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.860	0.555
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	8.647	5.579
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.996	1.288
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.117	0.075
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	0.966	0.623
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	10.000	6.452
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	20.444	13.189
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	13.305	8.584
12	9	58	16.0	3700.0	45.0	3.7685	KNOWN	0.619	0.399
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	3.434	2.215
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.666	0.430
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.438	0.928
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.959	0.619
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	35.413	22.847
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	37.595	24.255
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.076	0.694
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.266	0.171
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.406	1.552
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.728	1.115
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.641	1.704
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	8.025	5.178
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	20.846	13.449
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.413	1.557
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	15.112	9.749
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.315	0.849
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.139	0.089
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.089	1.348
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.037	1.314
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.262	1.459
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.392	3.479
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.927	0.598
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.149	0.742
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.849	3.128
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.390	0.252
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.113	2.009
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.584	0.377
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.028	0.663
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.922	0.595
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.921	1.884
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.721	0.465
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.326	2.146
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.754	1.132
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	4.623	2.982
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	8.219	5.303
55	34	33	12.0	4800.0	60.0	11.6306	KNOWN	0.072	0.047
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	5.352	3.453
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	1.001	0.646
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.647	1.708
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.432	0.279
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	1.586	1.023
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.051	1.323
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.061	0.684
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.750	0.484
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	0.442	0.285
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.948	0.612
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.569	0.367
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.409	1.554
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.377	0.889
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.510	0.329
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.770	0.497
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.648	2.366
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.687	0.443
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.329	0.212
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	4.486	2.894
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	0.543	0.350
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.565	0.364
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.421	0.272
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.396	0.901
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.984	1.280
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.793	0.512
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.555	1.003
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.394	1.545
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.135	1.377
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.049	0.677
47	50	47	12.0	2400.0	55.0	6.8389	KNOWN	0.603	0.389
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.368	0.237
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.548	4.224
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.783	5.021
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.913	0.589
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.449	3.516
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.429	2.213
99	50	63	12.0	8000.0	80.0	11.3045	KNOWN	1.186	0.765
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.022	3.240
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.027	1.308
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.325	2.145
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	1.206	0.778
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.226	0.146
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.258	0.811

TABLE - SHS12

12:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.888	-1.218	KNOWN	237.0		122.0
2	1	3	4	0	60.0	-0.836	-0.539	KNOWN	241.1		181.1
3	3	5	2	18	40.0	-4.379	-2.825	KNOWN	240.2		200.2
4	51	50	52	0	110.0	-4.796	-3.094	KNOWN	237.9		127.9
5	51	53	58	0	140.0	-1.099	-0.709	KNOWN	235.3		95.3
6	4	5	6	11	40.0	-0.634	-0.409	KNOWN	242.7		202.7
7	6	8	7	0	95.0	-0.418	-0.270	KNOWN	243.9		148.9
8	8	10	0	0	30.0	23.357	15.069		244.0	KNOWN	214.0
9	11	7	9	12	80.0	-1.671	-1.078	KNOWN	245.3		165.3
10	9	103	0	0	100.0	9.871	6.369	KNOWN	251.4		151.4
11	14	93	13	0	50.0	-1.160	-0.749	KNOWN	241.5		191.5
12	14	15	34	0	80.0	-1.547	-0.998	KNOWN	246.5		166.5
13	16	50	90	15	125.0	-3.497	-2.256	KNOWN	244.6		119.6
14	17	2	46	0	30.0	-1.671	-1.078	KNOWN	229.3		199.3
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	235.4		215.4
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	234.7		214.7
17	21	22	24	23	20.0	-1.454	-0.938	KNOWN	235.1		215.1
18	10	22	92	0	40.0	-0.836	-0.539	KNOWN	241.8		201.8
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	231.3		211.3
20	26	25	41	0	20.0	-0.774	-0.499	KNOWN	231.3		211.3
21	27	95	28	0	20.0	-0.387	-0.250	KNOWN	229.5		209.5
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	226.7		206.7
23	28	29	44	0	20.0	-1.532	-0.988	KNOWN	224.9		204.9
24	35	33	0	0	20.0	-2.754	-1.777	KNOWN	206.5		186.5
25	35	37	0	0	20.0	-0.990	-0.639	KNOWN	206.2		186.2
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	206.7		186.7
27	38	39	0	0	20.0	-1.764	-1.138	KNOWN	205.1		185.1
28	32	33	48	0	25.0	-1.362	-0.878	KNOWN	222.6		197.6
29	40	39	0	0	20.0	-0.201	-0.130	KNOWN	206.1		186.1
30	44	42	43	0	20.0	-3.868	-2.496	KNOWN	222.4		202.4
31	46	48	49	0	40.0	-1.563	-1.008	KNOWN	228.8		188.8
32	52	53	49	54	95.0	-0.913	-0.589	KNOWN	235.9		140.9
33	54	55	56	0	110.0	-2.924	-1.887	KNOWN	232.6		122.6
34	58	55	57	60	75.0	-1.640	-1.058	KNOWN	232.6		157.6
35	56	57	62	61	80.0	-1.640	-1.058	KNOWN	231.1		151.1
36	62	63	75	0	80.0	-1.269	-0.819	KNOWN	231.0		151.0
37	61	63	64	66	75.0	-1.269	-0.819	KNOWN	227.0		152.0
38	64	70	69	65	60.0	-1.454	-0.938	KNOWN	218.7		158.7
39	70	71	73	72	20.0	-1.176	-0.759	KNOWN	223.2		203.2
40	71	68	0	0	20.0	-1.160	-0.749	KNOWN	215.3		195.3
41	75	73	76	74	70.0	-0.913	-0.589	KNOWN	231.0		161.0
42	72	76	77	0	40.0	7.356	4.746		231.6	KNOWN	191.6
43	67	102	0	0	20.0	-0.990	-0.639	KNOWN	218.0		198.0
44	77	78	79	97	50.0	-3.466	-2.236	KNOWN	221.2		171.2
45	78	80	82	0	40.0	1.965	1.268	KNOWN	227.3		187.3
46	79	80	0	0	60.0	-3.172	-2.046	KNOWN	218.2		158.2
47	96	47	83	0	40.0	-1.269	-0.819	KNOWN	240.1		200.1
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	240.8		170.8
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	239.2		129.2
50	47	88	31	99	60.0	6.173	3.983	KNOWN	242.8		182.8
51	23	45	41	43	20.0	-18.350	-11.839	KNOWN	230.2		210.2
52	103	34	91	0	80.0	43.723	28.208		253.8	KNOWN	173.8
53	86	0	0	0	120.0	-0.913	-0.589	KNOWN	237.8		117.8
54	87	0	0	0	120.0	-2.011	-1.298	KNOWN	234.7		114.7
55	60	36	0	0	60.0	6.003	3.873	KNOWN	250.8		190.8
56	74	0	0	0	100.0	-0.818	-0.528		230.1	KNOWN	130.1
57	69	68	67	0	25.0	-1.454	-0.938	KNOWN	215.5		190.5
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	243.1		168.1
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	247.1		187.1
60	13	0	0	0	40.0	-0.975	-0.629	KNOWN	237.2		197.2
61	30	92	0	0	180.0	-0.634	-0.409	KNOWN	242.2		62.2
62	89	94	0	0	45.0	-0.975	-0.629	KNOWN	242.7		197.7
63	59	99	98	0	100.0	-1.377	-0.888	KNOWN	227.4		127.4
64	97	36	98	0	90.0	-1.980	-1.278	KNOWN	226.6		136.6
65	82	83	84	87	105.0	-1.640	-1.058	KNOWN	237.5		132.5
66	100	66	101	0	60.0	-0.356	-0.230	KNOWN	223.8		163.8
67	65	102	101	0	60.0	-0.356	-0.230	KNOWN	218.6		158.6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.242	0.801
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.574	1.016
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.929	0.599
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.718	1.108
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.795	2.449
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	13.441	8.671
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.150	0.742
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.680	1.729
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	6.949	4.483
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.681	0.439
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	20.008	12.908
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	14.530	9.374
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.929	0.600
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.512	0.330
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.329	7.309
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.862	0.556
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	7.586	4.894
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.888	1.218
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.015	0.009
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	2.264	1.460
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	9.483	6.118
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	21.093	13.608
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	12.764	8.235
12	9	58	16.0	3700.0	45.0	3.7685	KNOWN	0.748	0.482
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	2.892	1.866
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.666	0.430
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.469	0.948
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.975	0.629
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	33.621	21.691
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	35.834	23.119
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.955	0.616
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.408	0.263
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.494	1.609
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.736	1.120
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.771	1.788
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	8.222	5.305
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	21.511	13.878
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.520	1.626
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	15.801	10.194
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.254	0.809
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.142	0.091
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.193	1.415
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.139	1.380
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.283	1.473
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.552	3.582
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.987	0.637
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.111	0.717
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	5.007	3.231
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.420	0.271
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.174	2.048
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.571	0.368
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.036	0.669
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.929	0.599
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.922	1.885
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.728	0.469
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.424	2.209
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.783	1.150
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	4.579	2.954
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	8.109	5.231
55	34	33	12.0	4800.0	60.0	11.6306	KNOWN	0.030	0.019
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	5.214	3.364
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.953	0.615
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.606	1.681
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.495	0.319
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	1.430	0.923
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.040	1.316
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.056	0.682
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.748	0.482
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	0.586	0.378
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.952	0.614
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.567	0.366
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.416	1.559
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.405	0.906
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.509	0.328
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.780	0.503
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.673	2.370
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.698	0.450
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.381	0.246
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	5.990	3.865
74	41	56	16.0	3000.0	70.0	1.3464	KNOWN	0.818	0.528
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.667	0.430
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.430	0.278
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.420	0.916
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.906	1.230
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.819	0.528
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.711	1.104
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.353	1.518
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.294	1.480
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.039	0.671
47	50	47	12.0	2400.0	55.0	6.8389	KNOWN	0.607	0.392
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.378	0.244
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.666	4.301
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.891	5.091
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.913	0.589
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.567	3.592
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.502	2.259
99	50	63	12.0	8000.0	80.0	11.3045	KNOWN	1.176	0.759
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	4.997	3.224
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.011	1.298
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.397	2.192
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	1.108	0.715
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.295	0.190
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.268	0.818

TABLE - SHS13

13:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.903	-1.228	KNOWN	237.1		122.1
2	1	3	4	0	60.0	-0.851	-0.549	KNOWN	241.2		181.2
3	3	5	2	18	40.0	-4.441	-2.865	KNOWN	240.2		200.2
4	51	50	52	0	110.0	-4.858	-3.134	KNOWN	238.2		128.2
5	51	53	58	0	140.0	-1.037	-0.669	KNOWN	235.6		95.6
6	4	5	6	11	40.0	-0.634	-0.409	KNOWN	242.8		202.8
7	6	8	7	0	95.0	-0.433	-0.279	KNOWN	244.0		149.0
8	8	10	0	0	30.0	22.717	14.656		244.0	KNOWN	214.0
9	11	7	9	12	80.0	-1.686	-1.088	KNOWN	245.4		165.4
10	9	103	0	0	100.0	9.871	6.369	KNOWN	251.6		151.6
11	14	93	13	0	50.0	-1.068	-0.689	KNOWN	242.6		192.6
12	14	15	34	0	80.0	-1.423	-0.918	KNOWN	246.9		166.9
13	16	50	90	15	125.0	-3.203	-2.066	KNOWN	244.9		119.9
14	17	2	46	0	30.0	-1.686	-1.088	KNOWN	229.5		199.5
15	18	20	0	0	20.0	-0.201	-0.130	KNOWN	235.4		215.4
16	19	20	21	26	20.0	-0.201	-0.130	KNOWN	234.7		214.7
17	21	22	24	23	20.0	-1.485	-0.958	KNOWN	235.1		215.1
18	10	22	92	0	40.0	-0.851	-0.549	KNOWN	241.8		201.8
19	24	25	45	0	20.0	-0.201	-0.130	KNOWN	231.3		211.3
20	26	25	41	0	20.0	-0.774	-0.499	KNOWN	231.3		211.3
21	27	95	28	0	20.0	-0.387	-0.250	KNOWN	229.6		209.6
22	95	29	32	0	20.0	-0.201	-0.130	KNOWN	226.7		206.7
23	28	29	44	0	20.0	-1.547	-0.998	KNOWN	225.0		205.0
24	35	33	0	0	20.0	-2.723	-1.757	KNOWN	207.1		187.1
25	35	37	0	0	20.0	-0.959	-0.619	KNOWN	206.8		186.8
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	207.3		187.3
27	38	39	0	0	20.0	-1.748	-1.128	KNOWN	205.7		185.7
28	32	33	48	0	25.0	-1.362	-0.878	KNOWN	222.9		197.9
29	40	39	0	0	20.0	-0.201	-0.130	KNOWN	206.6		186.6
30	44	42	43	0	20.0	-3.868	-2.496	KNOWN	222.5		202.5
31	46	48	49	0	40.0	-1.563	-1.008	KNOWN	229.0		189.0
32	52	53	49	54	95.0	-0.866	-0.559	KNOWN	236.3		141.3
33	54	55	56	0	110.0	-2.770	-1.787	KNOWN	232.9		122.9
34	58	55	57	60	75.0	-1.563	-1.008	KNOWN	232.9		157.9
35	56	57	62	61	80.0	-1.563	-1.008	KNOWN	231.3		151.3
36	62	63	75	0	80.0	-1.207	-0.779	KNOWN	231.2		151.2
37	61	63	64	66	75.0	-1.207	-0.779	KNOWN	227.5		152.5
38	64	70	69	65	60.0	-1.377	-0.888	KNOWN	219.6		159.6
39	70	71	73	72	20.0	-1.160	-0.749	KNOWN	223.8		203.8
40	71	68	0	0	20.0	-1.160	-0.749	KNOWN	216.4		196.4
41	75	73	76	74	70.0	-0.866	-0.559	KNOWN	231.2		161.2
42	72	76	77	0	40.0	6.072	3.918		231.6	KNOWN	191.6
43	67	102	0	0	20.0	-0.959	-0.619	KNOWN	218.9		198.9
44	77	78	79	97	50.0	-3.481	-2.246	KNOWN	224.2		174.2
45	78	80	82	0	40.0	2.537	1.637	KNOWN	231.7		191.7
46	79	80	0	0	60.0	-3.094	-1.996	KNOWN	222.1		162.1
47	96	47	83	0	40.0	-1.207	-0.779	KNOWN	241.9		201.9
48	96	85	88	0	70.0	-0.170	-0.110	KNOWN	242.5		172.5
49	85	86	84	0	110.0	-0.170	-0.110	KNOWN	241.1		131.1
50	47	88	31	99	60.0	5.802	3.743	KNOWN	244.3		184.3
51	23	45	41	43	20.0	-18.350	-11.839	KNOWN	230.2		210.2
52	103	34	91	0	80.0	43.514	28.073		254.1	KNOWN	174.1
53	86	0	0	0	120.0	-0.866	-0.559	KNOWN	239.9		119.9
54	87	0	0	0	120.0	-1.903	-1.228	KNOWN	237.1		117.1
55	60	36	0	0	60.0	5.616	3.624	KNOWN	249.3		189.3
56	74	0	0	0	100.0	-0.264	-0.170		231.1	KNOWN	131.1
57	69	68	67	0	25.0	-1.377	-0.888	KNOWN	216.6		191.6
58	12	93	81	0	75.0	-0.356	-0.230	KNOWN	244.0		169.0
59	31	91	81	0	60.0	-0.356	-0.230	KNOWN	248.1		188.1
60	13	0	0	0	40.0	-0.882	-0.569	KNOWN	239.1		199.1
61	30	92	0	0	180.0	-0.634	-0.409	KNOWN	242.2		62.2
62	89	94	0	0	45.0	-0.882	-0.569	KNOWN	242.9		197.9
63	59	99	98	0	100.0	-1.346	-0.868	KNOWN	229.0		129.0
64	97	36	98	0	90.0	-1.934	-1.248	KNOWN	228.3		138.3
65	82	83	84	87	105.0	-1.563	-1.008	KNOWN	239.7		134.7
66	100	66	101	0	60.0	-0.356	-0.230	KNOWN	224.5		164.5
67	65	102	101	0	60.0	-0.356	-0.230	KNOWN	219.5		159.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.235	0.797
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.592	1.027
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.924	0.596
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.731	1.117
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.817	2.462
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	13.525	8.726
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.144	0.738
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.693	1.738
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	6.979	4.502
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.670	0.433
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	19.991	12.898
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	14.463	9.331
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.886	0.571
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.519	0.335
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	10.973	7.079
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.861	0.555
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	7.998	5.160
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.968	1.269
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.112	0.072
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	1.694	1.093
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	9.712	6.266
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	21.023	13.563
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	12.846	8.288
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.586	0.378
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	2.975	1.919
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.604	0.390
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.345	0.868
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.882	0.569
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	33.779	21.793
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	35.807	23.101
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.994	0.641
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.382	0.246
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.492	1.608
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.702	1.098
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.778	1.792
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	8.194	5.286
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	21.505	13.874
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.521	1.627
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	15.797	10.192
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.333	0.860
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.132	0.085
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.188	1.412
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.136	1.378
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.271	1.465
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.536	3.571
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.987	0.637
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.083	0.699
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.976	3.210
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.417	0.269
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.140	2.026
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.542	0.350
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.028	0.663
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.922	0.595
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.879	1.857
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.721	0.465
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.419	2.206
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.771	1.142
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	4.600	2.968
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	8.111	5.233
55	34	33	12.0	4800.0	60.0	11.6306	KNOWN	0.018	0.012
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	5.360	3.458
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.976	0.629
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.466	1.591
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.429	0.277
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	1.775	1.145
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.970	1.271
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.027	0.663
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.718	0.463
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	0.156	0.101
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.925	0.597
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.556	0.359
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.322	1.498
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.365	0.881
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.506	0.327
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.755	0.487
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.567	2.301
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.671	0.433
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.406	0.262
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	4.846	3.127
74	41	56	16.0	3000.0	70.0	1.3464	KNOWN	0.264	0.170
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.555	0.358
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.418	0.270
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.377	0.888
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.128	1.373
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.675	0.435
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.473	0.951
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.420	1.561
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.010	1.297
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	0.986	0.636
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.567	0.366
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.347	0.224
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.166	3.978
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.323	4.724
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.866	0.559
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.129	3.309
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.262	2.104
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.174	0.758
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	4.732	3.053
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	1.903	1.228
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.150	2.032
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	1.115	0.719
98	63	64	12.0	2400.0	50.0	0.1481	KNOWN	0.257	0.166
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.227	0.791

TABLE - SHS14

14:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.888	-1.218	KNOWN	237.4		122.4
2	1	3	4	0	60.0	-0.836	-0.539	KNOWN	241.4		181.4
3	3	5	2	18	40.0	-4.410	-2.845	KNOWN	240.4		200.4
4	51	50	52	0	110.0	-4.827	-3.114	KNOWN	238.6		128.6
5	51	53	58	0	140.0	-1.083	-0.699	KNOWN	236.1		96.1
6	4	5	6	11	40.0	-0.619	-0.399	KNOWN	242.9		202.9
7	6	8	7	0	95.0	-0.433	-0.279	KNOWN	244.0		149.0
8	8	10	0	0	30.0	21.673	13.982		244.0	KNOWN	214.0
9	11	7	9	12	80.0	-1.671	-1.078	KNOWN	245.9		165.9
10	9	103	0	0	100.0	9.887	6.379	KNOWN	251.6		151.6
11	14	93	13	0	50.0	-1.037	-0.669	KNOWN	242.7		192.7
12	14	15	34	0	80.0	-1.393	-0.898	KNOWN	247.0		167.0
13	16	50	90	15	125.0	-3.125	-2.016	KNOWN	245.0		120.0
14	17	2	46	0	30.0	-1.671	-1.078	KNOWN	230.0		200.0
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	235.8		215.8
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	235.2		215.2
17	21	22	24	23	20.0	-1.470	-0.948	KNOWN	235.5		215.5
18	10	22	92	0	40.0	-0.836	-0.539	KNOWN	241.9		201.9
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	232.0		212.0
20	26	25	41	0	20.0	-0.743	-0.479	KNOWN	231.9		211.9
21	27	95	28	0	20.0	-0.387	-0.250	KNOWN	230.2		210.2
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	227.4		207.4
23	28	29	44	0	20.0	-1.485	-0.958	KNOWN	225.7		205.7
24	35	33	0	0	20.0	-2.723	-1.757	KNOWN	207.6		187.6
25	35	37	0	0	20.0	-0.975	-0.629	KNOWN	207.3		187.3
26	37	38	40	42	20.0	-0.402	-0.260	KNOWN	207.8		187.8
27	38	39	0	0	20.0	-1.748	-1.128	KNOWN	206.2		186.2
28	32	33	48	0	25.0	-1.377	-0.888	KNOWN	223.4		198.4
29	40	39	0	0	20.0	-0.201	-0.130	KNOWN	207.2		187.2
30	44	42	43	0	20.0	-3.744	-2.416	KNOWN	223.3		203.3
31	46	48	49	0	40.0	-1.547	-0.998	KNOWN	229.5		189.5
32	52	53	49	54	95.0	-0.897	-0.579	KNOWN	236.7		141.7
33	54	55	56	0	110.0	-2.893	-1.867	KNOWN	233.6		123.6
34	58	55	57	60	75.0	-1.625	-1.048	KNOWN	233.6		158.6
35	56	57	62	61	80.0	-1.625	-1.048	KNOWN	232.3		152.3
36	62	63	75	0	80.0	-1.269	-0.819	KNOWN	232.3		152.3
37	61	63	64	66	75.0	-1.269	-0.819	KNOWN	228.3		153.3
38	64	70	69	65	60.0	-1.454	-0.938	KNOWN	220.0		160.0
39	70	71	73	72	20.0	-1.176	-0.759	KNOWN	224.6		204.6
40	71	68	0	0	20.0	-1.129	-0.729	KNOWN	216.8		196.8
41	75	73	76	74	70.0	-0.897	-0.579	KNOWN	232.3		162.3
42	72	76	77	0	40.0	7.833	5.053		233.0	KNOWN	193.0
43	67	102	0	0	20.0	-0.975	-0.629	KNOWN	219.3		199.3
44	77	78	79	97	50.0	-3.373	-2.176	KNOWN	224.0		174.0
45	78	80	82	0	40.0	2.274	1.467	KNOWN	230.4		190.4
46	79	80	0	0	60.0	-3.048	-1.966	KNOWN	221.6		161.6
47	96	47	83	0	40.0	-1.269	-0.819	KNOWN	240.6		200.6
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	241.2		171.2
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	239.8		129.8
50	47	88	31	99	60.0	5.709	3.683	KNOWN	243.1		183.1
51	23	45	41	43	20.0	-17.809	-11.489	KNOWN	230.9		210.9
52	103	34	91	0	80.0	43.378	27.986		254.1	KNOWN	174.1
53	86	0	0	0	120.0	-0.897	-0.579	KNOWN	238.4		118.4
54	87	0	0	0	120.0	-1.996	-1.288	KNOWN	235.5		115.5
55	60	36	0	0	60.0	5.663	3.653	KNOWN	250.0		190.0
56	74	0	0	0	100.0	-0.953	-0.615		231.1	KNOWN	131.1
57	69	68	67	0	25.0	-1.454	-0.938	KNOWN	217.0		192.0
58	12	93	81	0	75.0	-0.356	-0.230	KNOWN	244.0		169.0
59	31	91	81	0	60.0	-0.356	-0.230	KNOWN	247.5		187.5
60	13	0	0	0	40.0	-0.866	-0.559	KNOWN	239.2		199.2
61	30	92	0	0	180.0	-0.619	-0.399	KNOWN	242.3		62.3
62	89	94	0	0	45.0	-0.866	-0.559	KNOWN	243.0		198.0
63	59	99	98	0	100.0	-1.331	-0.858	KNOWN	229.1		129.1
64	97	36	98	0	90.0	-1.903	-1.228	KNOWN	228.5		138.5
65	82	83	84	87	105.0	-1.625	-1.048	KNOWN	238.2		133.2
66	100	66	101	0	60.0	-0.371	-0.240	KNOWN	225.1		165.1
67	65	102	101	0	60.0	-0.371	-0.240	KNOWN	219.9		159.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.218	0.786
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.581	1.020
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.912	0.588
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.697	1.095
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.751	2.420
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	13.282	8.569
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.129	0.728
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.628	1.696
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	6.813	4.396
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.664	0.428
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	19.638	12.669
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	14.147	9.127
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.908	0.586
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.488	0.315
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	10.514	6.783
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.846	0.546
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	8.113	5.234
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.958	1.263
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.137	0.088
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	1.224	0.789
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	9.723	6.273
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	20.449	13.193
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	12.846	8.288
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.606	0.391
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	2.959	1.909
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.611	0.394
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.292	0.833
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.866	0.559
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	33.461	21.588
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	35.464	22.880
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.003	0.647
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.369	0.238
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.442	1.576
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.684	1.086
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.692	1.737
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	8.062	5.201
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	20.952	13.518
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.448	1.579
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	15.350	9.903
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.339	0.864
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.131	0.085
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.131	1.375
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.080	1.342
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.246	1.449
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.429	3.503
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.956	0.617
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.104	0.713
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.900	3.161
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.418	0.269
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.141	2.026
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.557	0.359
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.028	0.663
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.922	0.595
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.909	1.877
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.721	0.465
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.413	2.202
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.753	1.131
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	4.591	2.962
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	7.751	5.000
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.005	0.003
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	4.847	3.127
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.880	0.568
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.468	1.592
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.462	0.298
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	1.013	0.653
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.034	1.312
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.056	0.681
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.749	0.483
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	1.005	0.648
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.946	0.610
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.568	0.367
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.412	1.556
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.386	0.894
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.517	0.334
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.774	0.499
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.661	2.362
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.700	0.452
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.356	0.230
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	6.517	4.204
74	41	56	16.0	3000.0	70.0	1.3464	KNOWN	0.953	0.615
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.616	0.397
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.424	0.274
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.399	0.903
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.950	1.258
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.734	0.474
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.541	0.994
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.314	1.493
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.990	1.284
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.035	0.667
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.588	0.379
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.354	0.228
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.340	4.090
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.560	4.877
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.897	0.579
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.257	3.391
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.557	2.295
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.118	0.721
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	4.955	3.197
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	1.996	1.288
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.195	2.061
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	1.042	0.672
98	63	64	12.0	2400.0	50.0	0.1481	KNOWN	0.249	0.161
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.253	0.808

TABLE - SHS15

15:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.454	-0.938	KNOWN	239.2		124.2
2	1	3	4	0	60.0	-0.650	-0.419	KNOWN	241.9		181.9
3	3	5	2	18	40.0	-3.373	-2.176	KNOWN	240.8		200.8
4	51	50	52	0	110.0	-3.713	-2.396	KNOWN	239.5		129.5
5	51	53	58	0	140.0	-1.114	-0.719	KNOWN	236.9		96.9
6	4	5	6	11	40.0	-0.495	-0.319	KNOWN	243.1		203.1
7	6	8	7	0	95.0	-0.309	-0.200	KNOWN	244.0		149.0
8	8	10	0	0	30.0	20.589	13.284		244.0	KNOWN	214.0
9	11	7	9	12	80.0	-1.300	-0.838	KNOWN	245.6		165.6
10	9	103	0	0	100.0	9.887	6.379	KNOWN	251.6		151.6
11	14	93	13	0	50.0	-1.052	-0.679	KNOWN	242.4		192.4
12	14	15	34	0	80.0	-1.408	-0.908	KNOWN	247.3		167.3
13	16	50	90	15	125.0	-3.156	-2.036	KNOWN	245.4		120.4
14	17	2	46	0	30.0	-1.300	-0.838	KNOWN	231.8		201.8
15	18	20	0	0	20.0	-0.201	-0.130	KNOWN	235.4		215.4
16	19	20	21	26	20.0	-0.201	-0.130	KNOWN	234.7		214.7
17	21	22	24	23	20.0	-1.114	-0.719	KNOWN	235.0		215.0
18	10	22	92	0	40.0	-0.650	-0.419	KNOWN	241.8		201.8
19	24	25	45	0	20.0	-0.201	-0.130	KNOWN	230.9		210.9
20	26	25	41	0	20.0	-0.820	-0.529	KNOWN	230.9		210.9
21	27	95	28	0	20.0	-0.418	-0.270	KNOWN	229.4		209.4
22	95	29	32	0	20.0	-0.201	-0.130	KNOWN	226.6		206.6
23	28	29	44	0	20.0	-1.625	-1.048	KNOWN	224.5		204.5
24	35	33	0	0	20.0	-2.754	-1.777	KNOWN	206.9		186.9
25	35	37	0	0	20.0	-0.975	-0.629	KNOWN	206.6		186.6
26	37	38	40	42	20.0	-0.402	-0.260	KNOWN	206.9		186.9
27	38	39	0	0	20.0	-1.764	-1.138	KNOWN	205.4		185.4
28	32	33	48	0	25.0	-1.377	-0.888	KNOWN	223.5		198.5
29	40	39	0	0	20.0	-0.186	-0.120	KNOWN	206.3		186.3
30	44	42	43	0	20.0	-4.069	-2.625	KNOWN	221.9		201.9
31	46	48	49	0	40.0	-1.563	-1.008	KNOWN	230.5		190.5
32	52	53	49	54	95.0	-0.928	-0.599	KNOWN	237.6		142.6
33	54	55	56	0	110.0	-3.002	-1.937	KNOWN	234.5		124.5
34	58	55	57	60	75.0	-1.686	-1.088	KNOWN	233.9		158.9
35	56	57	62	61	80.0	-1.686	-1.088	KNOWN	233.3		153.3
36	62	63	75	0	80.0	-1.315	-0.848	KNOWN	233.3		153.3
37	61	63	64	66	75.0	-1.315	-0.848	KNOWN	229.1		154.1
38	64	70	69	65	60.0	-1.501	-0.968	KNOWN	220.5		160.5
39	70	71	73	72	20.0	-1.160	-0.749	KNOWN	225.4		205.4
40	71	68	0	0	20.0	-1.222	-0.789	KNOWN	216.9		196.9
41	75	73	76	74	70.0	-0.928	-0.599	KNOWN	233.5		163.5
42	72	76	77	0	40.0	8.797	5.675		234.3	KNOWN	194.3
43	67	102	0	0	20.0	-0.975	-0.629	KNOWN	219.8		199.8
44	77	78	79	97	50.0	-3.667	-2.366	KNOWN	220.3		170.3
45	78	80	82	0	40.0	2.507	1.617	KNOWN	227.5		187.5
46	79	80	0	0	60.0	-3.156	-2.036	KNOWN	217.9		157.9
47	96	47	83	0	40.0	-1.315	-0.848	KNOWN	237.7		197.7
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	238.4		168.4
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	236.9		126.9
50	47	88	31	99	60.0	5.322	3.434	KNOWN	240.4		180.4
51	23	45	41	43	20.0	-19.348	-12.478	KNOWN	229.7		209.7
52	103	34	91	0	80.0	43.060	27.780		254.1	KNOWN	174.1
53	86	0	0	0	120.0	-0.928	-0.599	KNOWN	235.5		115.5
54	87	0	0	0	120.0	-2.073	-1.338	KNOWN	232.3		112.3
55	60	36	0	0	60.0	5.245	3.384	KNOWN	245.9		185.9
56	74	0	0	0	100.0	-0.794	-0.512		232.6	KNOWN	132.6
57	69	68	67	0	25.0	-1.501	-0.968	KNOWN	217.1		192.1
58	12	93	81	0	75.0	-0.340	-0.220	KNOWN	243.6		168.6
59	31	91	81	0	60.0	-0.340	-0.220	KNOWN	246.4		186.4
60	13	0	0	0	40.0	-0.866	-0.559	KNOWN	238.9		198.9
61	30	92	0	0	180.0	-0.495	-0.319	KNOWN	242.5		62.5
62	89	94	0	0	45.0	-0.866	-0.559	KNOWN	243.2		198.2
63	59	99	98	0	100.0	-1.377	-0.888	KNOWN	226.1		126.1
64	97	36	98	0	90.0	-1.980	-1.278	KNOWN	224.8		134.8
65	82	83	84	87	105.0	-1.686	-1.088	KNOWN	235.3		130.3
66	100	66	101	0	60.0	-0.371	-0.240	KNOWN	225.8		165.8
67	65	102	101	0	60.0	-0.371	-0.240	KNOWN	220.4		160.4

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.965	0.622
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.403	0.905
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.913	0.589
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.790	1.155
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.405	2.197
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	12.837	8.282
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.038	0.670
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.844	1.835
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	7.373	4.757
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.682	0.440
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	18.660	12.039
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	14.265	9.203
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.981	0.633
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.549	0.354
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	9.456	6.100
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.826	0.533
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	8.411	5.426
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	2.121	1.369
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.167	0.108
8	7	8	36.0	2400.0	75.0	0.0183	KNOWN	0.214	0.138
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	9.981	6.439
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	20.803	13.421
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	12.804	8.261
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.700	0.452
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	2.918	1.882
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.654	0.422
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.264	0.816
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.866	0.559
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	32.664	21.073
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	34.726	22.404
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.034	0.667
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.651	0.420
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.643	1.705
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.480	0.955
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.952	1.905
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	8.343	5.382
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	21.780	14.051
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.636	1.700
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	16.550	10.677
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.626	1.049
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.125	0.081
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.309	1.490
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.257	1.456
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.237	1.443
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.688	3.670
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	1.080	0.696
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.956	0.617
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	5.143	3.318
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.477	0.307
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.231	2.084
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.498	0.321
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.033	0.667
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.916	0.591
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.850	1.839
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.730	0.471
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.651	2.356
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.776	1.146
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	4.563	2.944
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	7.793	5.028
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.211	0.136
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	4.581	2.955
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.545	0.351
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.088	1.347
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.616	0.398
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	0.264	0.170
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.088	1.347
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.079	0.696
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.772	0.498
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	1.816	1.172
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.968	0.624
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.578	0.373
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.506	1.617
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.461	0.943
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.512	0.330
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.810	0.523
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.753	2.421
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.723	0.467
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.412	0.266
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	7.292	4.704
74	41	56	16.0	3000.0	70.0	1.3464	KNOWN	0.794	0.512
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.782	0.504
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.452	0.291
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.427	0.920
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.074	1.338
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.735	0.474
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.547	0.998
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.421	1.562
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.989	1.283
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.072	0.692
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.605	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.361	0.233
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.501	4.194
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.758	5.005
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.928	0.599
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.387	3.475
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	4.171	2.691
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.131	0.729
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.417	3.495
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.073	1.338
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.157	2.037
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.905	0.584
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.370	0.239
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.286	0.830

TABLE - SHS16

16:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.269	-0.819	KNOWN	240.0		125.0
2	1	3	4	0	60.0	-0.572	-0.369	KNOWN	242.1		182.1
3	3	5	2	18	40.0	-2.971	-1.917	KNOWN	241.0		201.0
4	51	50	52	0	110.0	-3.265	-2.106	KNOWN	239.4		129.4
5	51	53	58	0	140.0	-1.207	-0.779	KNOWN	236.4		96.4
6	4	5	6	11	40.0	-0.433	-0.279	KNOWN	243.3		203.3
7	6	8	7	0	95.0	-0.279	-0.180	KNOWN	244.0		149.0
8	8	10	0	0	30.0	19.659	12.684		244.0	KNOWN	214.0
9	11	7	9	12	80.0	-1.129	-0.729	KNOWN	245.7		165.7
10	9	103	0	0	100.0	9.902	6.389	KNOWN	251.7		151.7
11	14	93	13	0	50.0	-0.975	-0.629	KNOWN	242.8		192.8
12	14	15	34	0	80.0	-1.284	-0.829	KNOWN	247.4		167.4
13	16	50	90	15	125.0	-2.893	-1.867	KNOWN	245.5		120.5
14	17	2	46	0	30.0	-1.129	-0.729	KNOWN	232.7		202.7
15	18	20	0	0	20.0	-0.201	-0.130	KNOWN	235.5		215.5
16	19	20	21	26	20.0	-0.201	-0.130	KNOWN	234.7		214.7
17	21	22	24	23	20.0	-0.990	-0.639	KNOWN	235.0		215.0
18	10	22	92	0	40.0	-0.572	-0.369	KNOWN	241.9		201.9
19	24	25	45	0	20.0	-0.201	-0.130	KNOWN	230.7		210.7
20	26	25	41	0	20.0	-0.820	-0.529	KNOWN	230.7		210.7
21	27	95	28	0	20.0	-0.418	-0.270	KNOWN	229.5		209.5
22	95	29	32	0	20.0	-0.201	-0.130	KNOWN	226.8		206.8
23	28	29	44	0	20.0	-1.671	-1.078	KNOWN	224.6		204.6
24	35	33	0	0	20.0	-2.661	-1.717	KNOWN	208.2		188.2
25	35	37	0	0	20.0	-0.944	-0.609	KNOWN	207.9		187.9
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	208.2		188.2
27	38	39	0	0	20.0	-1.702	-1.098	KNOWN	206.7		186.7
28	32	33	48	0	25.0	-1.315	-0.848	KNOWN	224.1		199.1
29	40	39	0	0	20.0	-0.186	-0.120	KNOWN	207.6		187.6
30	44	42	43	0	20.0	-4.162	-2.685	KNOWN	222.0		202.0
31	46	48	49	0	40.0	-1.516	-0.978	KNOWN	230.9		190.9
32	52	53	49	54	95.0	-1.006	-0.649	KNOWN	237.4		142.4
33	54	55	56	0	110.0	-3.234	-2.086	KNOWN	233.6		123.6
34	58	55	57	60	75.0	-1.810	-1.168	KNOWN	232.5		157.5
35	56	57	62	61	80.0	-1.810	-1.168	KNOWN	232.2		152.2
36	62	63	75	0	80.0	-1.408	-0.908	KNOWN	232.2		152.2
37	61	63	64	66	75.0	-1.408	-0.908	KNOWN	227.5		152.5
38	64	70	69	65	60.0	-1.625	-1.048	KNOWN	218.3		158.3
39	70	71	73	72	20.0	-1.129	-0.729	KNOWN	223.7		203.7
40	71	68	0	0	20.0	-1.253	-0.809	KNOWN	214.3		194.3
41	75	73	76	74	70.0	-1.006	-0.649	KNOWN	232.4		162.4
42	72	76	77	0	40.0	7.939	5.122		233.0	KNOWN	193.0
43	67	102	0	0	20.0	-0.944	-0.609	KNOWN	217.5		197.5
44	77	78	79	97	50.0	-3.744	-2.416	KNOWN	218.3		168.3
45	78	80	82	0	40.0	2.630	1.697	KNOWN	226.0		186.0
46	79	80	0	0	60.0	-3.218	-2.076	KNOWN	215.9		155.9
47	96	47	83	0	40.0	-1.408	-0.908	KNOWN	236.5		196.5
48	96	85	88	0	70.0	-0.201	-0.130	KNOWN	237.4		167.4
49	85	86	84	0	110.0	-0.201	-0.130	KNOWN	235.7		125.7
50	47	88	31	99	60.0	5.632	3.633	KNOWN	239.6		179.6
51	23	45	41	43	20.0	-19.774	-12.757	KNOWN	229.5		209.5
52	103	34	91	0	80.0	43.083	27.796		254.2	KNOWN	174.2
53	86	0	0	0	120.0	-1.006	-0.649	KNOWN	234.0		114.0
54	87	0	0	0	120.0	-2.228	-1.437	KNOWN	230.5		110.5
55	60	36	0	0	60.0	5.044	3.254	KNOWN	243.1		183.1
56	74	0	0	0	100.0	0.398	0.257		232.6	KNOWN	132.6
57	69	68	67	0	25.0	-1.625	-1.048	KNOWN	214.5		189.5
58	12	93	81	0	75.0	-0.325	-0.210	KNOWN	243.9		168.9
59	31	91	81	0	60.0	-0.325	-0.210	KNOWN	246.1		186.1
60	13	0	0	0	40.0	-0.805	-0.519	KNOWN	239.9		199.9
61	30	92	0	0	180.0	-0.433	-0.279	KNOWN	242.5		62.5
62	89	94	0	0	45.0	-0.805	-0.519	KNOWN	243.4		198.4
63	59	99	98	0	100.0	-1.393	-0.898	KNOWN	224.3		124.3
64	97	36	98	0	90.0	-1.996	-1.288	KNOWN	222.7		132.7
65	82	83	84	87	105.0	-1.810	-1.168	KNOWN	233.9		128.9
66	100	66	101	0	60.0	-0.402	-0.260	KNOWN	223.9		163.9
67	65	102	101	0	60.0	-0.402	-0.260	KNOWN	218.2		158.2

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	- STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.852	0.550
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.322	0.853
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.906	0.584
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.808	1.167
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.233	2.086
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	12.545	8.094
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.996	0.642
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.891	1.865
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	7.496	4.836
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.733	0.473
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	19.027	12.276
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	15.029	9.696
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	1.105	0.713
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.631	0.407
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	8.883	5.731
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.821	0.529
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	8.448	5.450
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	2.159	1.393
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.218	0.140
8	7	8	36.0	2400.0	75.0	0.0183	KNOWN	1.040	0.671
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	10.208	6.586
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	20.705	13.358
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	12.820	8.271
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.663	0.428
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	2.918	1.883
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.629	0.406
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.150	0.742
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.805	0.519
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	32.713	21.105
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	34.626	22.340
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.022	0.660
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.772	0.498
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.690	1.735
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.347	0.869
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	3.021	1.949
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	8.311	5.362
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	21.857	14.101
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.678	1.727
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	16.843	10.866
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.725	1.113
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.112	0.072
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.364	1.525
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.313	1.492
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.193	1.415
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.700	3.677
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	1.112	0.717
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.880	0.568
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	5.141	3.317
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.493	0.318
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.154	2.035
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.451	0.291
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.998	0.644
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.889	0.574
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.725	1.758
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.704	0.454
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.589	2.315
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.746	1.127
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	4.333	2.796
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	8.585	5.539
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.283	0.182
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	5.069	3.270
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.410	0.265
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.943	1.254
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.637	0.411
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	0.331	0.214
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.204	1.422
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.133	0.731
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.815	0.526
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	1.892	1.220
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	1.007	0.650
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.603	0.389
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.652	1.711
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.540	0.994
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.495	0.319
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.854	0.551
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.895	2.513
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.741	0.478
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.399	0.257
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	6.394	4.125
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	0.398	0.257
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.803	0.518
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.483	0.312
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.427	0.921
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.151	1.388
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.732	0.472
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.522	0.982
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.486	1.604
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.007	1.295
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.145	0.739
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.642	0.414
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.379	0.245
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.873	4.434
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	8.219	5.303
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	1.006	0.649
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.666	3.655
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	4.402	2.840
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.173	0.756
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.539	3.573
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.228	1.437
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.101	2.000
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.812	0.524
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.417	0.269
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.335	0.861

TABLE - SHS17

17:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.269	-0.819	KNOWN	242.1		127.1
2	1	3	4	0	60.0	-0.557	-0.359	KNOWN	244.6		184.6
3	3	5	2	18	40.0	-2.940	-1.897	KNOWN	243.7		203.7
4	51	50	52	0	110.0	-3.234	-2.086	KNOWN	240.3		130.3
5	51	53	58	0	140.0	-1.269	-0.819	KNOWN	236.9		96.9
6	4	5	6	11	40.0	-0.433	-0.279	KNOWN	245.7		205.7
7	6	8	7	0	95.0	-0.279	-0.180	KNOWN	246.9		151.9
8	8	10	0	0	30.0	22.808	14.715		247.0	KNOWN	217.0
9	11	7	9	12	80.0	-1.129	-0.729	KNOWN	248.1		168.1
10	9	103	0	0	100.0	9.732	6.279	KNOWN	253.2		153.2
11	14	93	13	0	50.0	-1.021	-0.659	KNOWN	243.9		193.9
12	14	15	34	0	80.0	-1.377	-0.888	KNOWN	248.3		168.3
13	16	50	90	15	125.0	-3.079	-1.986	KNOWN	246.7		121.7
14	17	2	46	0	30.0	-1.129	-0.729	KNOWN	235.1		205.1
15	18	20	0	0	20.0	-0.201	-0.130	KNOWN	239.0		219.0
16	19	20	21	26	20.0	-0.201	-0.130	KNOWN	238.5		218.5
17	21	22	24	23	20.0	-0.975	-0.629	KNOWN	238.6		218.6
18	10	22	92	0	40.0	-0.557	-0.359	KNOWN	245.0		205.0
19	24	25	45	0	20.0	-0.201	-0.130	KNOWN	234.8		214.8
20	26	25	41	0	20.0	-0.774	-0.499	KNOWN	234.8		214.8
21	27	95	28	0	20.0	-0.402	-0.260	KNOWN	233.6		213.6
22	95	29	32	0	20.0	-0.201	-0.130	KNOWN	231.1		211.1
23	28	29	44	0	20.0	-1.563	-1.008	KNOWN	229.3		209.3
24	35	33	0	0	20.0	-2.398	-1.547	KNOWN	215.3		195.3
25	35	37	0	0	20.0	-0.851	-0.549	KNOWN	215.0		195.0
26	37	38	40	42	20.0	-0.340	-0.220	KNOWN	215.3		195.3
27	38	39	0	0	20.0	-1.547	-0.998	KNOWN	214.1		194.1
28	32	33	48	0	25.0	-1.191	-0.769	KNOWN	228.2		203.2
29	40	39	0	0	20.0	-0.170	-0.110	KNOWN	214.8		194.8
30	44	42	43	0	20.0	-3.914	-2.525	KNOWN	227.0		207.0
31	46	48	49	0	40.0	-1.377	-0.888	KNOWN	233.2		193.2
32	52	53	49	54	95.0	-1.052	-0.679	KNOWN	238.0		143.0
33	54	55	56	0	110.0	-3.373	-2.176	KNOWN	233.4		123.4
34	58	55	57	60	75.0	-1.888	-1.218	KNOWN	232.2		157.2
35	56	57	62	61	80.0	-1.888	-1.218	KNOWN	231.4		151.4
36	62	63	75	0	80.0	-1.485	-0.958	KNOWN	231.3		151.3
37	61	63	64	66	75.0	-1.485	-0.958	KNOWN	226.5		151.5
38	64	70	69	65	60.0	-1.686	-1.088	KNOWN	217.4		157.4
39	70	71	73	72	20.0	-1.021	-0.659	KNOWN	222.9		202.9
40	71	68	0	0	20.0	-1.176	-0.759	KNOWN	213.6		193.6
41	75	73	76	74	70.0	-1.052	-0.679	KNOWN	231.3		161.3
42	72	76	77	0	40.0	6.157	3.972		231.7	KNOWN	191.7
43	67	102	0	0	20.0	-0.851	-0.549	KNOWN	216.8		196.8
44	77	78	79	97	50.0	-3.512	-2.266	KNOWN	221.6		171.6
45	78	80	82	0	40.0	3.141	2.026	KNOWN	229.9		189.9
46	79	80	0	0	60.0	-3.249	-2.096	KNOWN	219.4		159.4
47	96	47	83	0	40.0	-1.485	-0.958	KNOWN	237.9		197.9
48	96	85	88	0	70.0	-0.217	-0.140	KNOWN	238.8		168.8
49	85	86	84	0	110.0	-0.217	-0.140	KNOWN	237.1		127.1
50	47	88	31	99	60.0	5.818	3.753	KNOWN	240.9		180.9
51	23	45	41	43	20.0	-18.567	-11.979	KNOWN	233.7		213.7
52	103	34	91	0	80.0	39.070	25.207		254.2	KNOWN	174.2
53	86	0	0	0	120.0	-1.052	-0.679	KNOWN	235.3		115.3
54	87	0	0	0	120.0	-2.321	-1.497	KNOWN	231.8		111.8
55	60	36	0	0	60.0	5.168	3.334	KNOWN	244.6		184.6
56	74	0	0	0	100.0	0.972	0.627		232.6	KNOWN	132.6
57	69	68	67	0	25.0	-1.686	-1.088	KNOWN	213.8		188.8
58	12	93	81	0	75.0	-0.340	-0.220	KNOWN	245.2		170.2
59	31	91	81	0	60.0	-0.340	-0.220	KNOWN	246.9		186.9
60	13	0	0	0	40.0	-0.851	-0.549	KNOWN	240.6		200.6
61	30	92	0	0	180.0	-0.433	-0.279	KNOWN	245.3		65.3
62	89	94	0	0	45.0	-0.851	-0.549	KNOWN	245.7		200.7
63	59	99	98	0	100.0	-1.423	-0.918	KNOWN	225.8		125.8
64	97	36	98	0	90.0	-2.027	-1.308	KNOWN	224.9		134.9
65	82	83	84	87	105.0	-1.888	-1.218	KNOWN	235.5		130.5
66	100	66	101	0	60.0	-0.433	-0.279	KNOWN	222.9		162.9
67	65	102	101	0	60.0	-0.433	-0.279	KNOWN	217.3		157.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.950	0.613
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.205	0.777
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.886	0.572
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.649	1.064
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.156	2.036
5	6	3	36.0	1800.0	60.0	0.0287	KNOWN	11.866	7.655
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.017	0.656
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.662	1.717
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	6.896	4.449
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.773	0.499
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	19.651	12.678
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	15.644	10.093
53	32	5	16.0	2000.0	75.0	0.7980	KNOWN	1.199	0.773
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.703	0.454
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.073	7.144
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.817	0.527
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	5.361	3.459
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.648	1.063
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.147	0.095
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	2.605	1.681
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	8.746	5.643
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	20.203	13.034
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	11.571	7.465
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.879	0.567
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	1.839	1.187
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.618	0.399
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.254	0.809
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.851	0.549
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	30.060	19.395
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	31.995	20.642
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.703	0.454
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.774	0.499
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.461	1.588
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.514	0.976
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.813	1.815
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	7.856	5.068
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	20.861	13.459
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.525	1.629
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	15.847	10.224
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.215	0.784
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.117	0.076
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.207	1.424
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.157	1.392
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.122	1.369
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.331	3.439
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.995	0.642
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.926	0.598
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.763	3.073
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.416	0.268
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.814	1.815
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.435	0.281
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.908	0.586
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.810	0.522
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.493	1.609
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.639	0.412
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.079	1.986
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.644	1.061
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.682	2.375
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	9.711	6.265
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.291	0.188
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.047	3.901
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.678	0.437
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.126	1.372
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.555	0.358
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	1.438	0.928
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.254	1.454
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.146	0.739
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.827	0.534
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	0.875	0.564
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.996	0.642
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.600	0.387
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.673	1.725
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.526	0.984
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.457	0.295
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.852	0.550
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.829	2.470
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.717	0.463
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.324	0.209
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	4.784	3.086
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	0.972	0.627
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.655	0.423
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.485	0.313
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.336	0.862
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.246	1.449
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.702	0.453
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.313	0.847
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.547	1.643
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.652	1.066
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.199	0.774
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.648	0.418
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.362	0.234
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.767	4.366
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	8.183	5.279
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	1.052	0.679
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.498	3.547
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	4.181	2.697
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.167	0.753
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.237	3.379
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.321	1.497
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.042	1.962
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.716	0.462
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.298	0.192
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.313	0.847

TABLE - SHS18

18:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.269	-0.819	KNOWN	242.8		127.8
2	1	3	4	0	60.0	-0.557	-0.359	KNOWN	245.5		185.5
3	3	5	2	18	40.0	-2.955	-1.907	KNOWN	244.7		204.7
4	51	50	52	0	110.0	-3.249	-2.096	KNOWN	240.5		130.5
5	51	53	58	0	140.0	-1.253	-0.809	KNOWN	236.9		96.9
6	4	5	6	11	40.0	-0.418	-0.270	KNOWN	246.6		206.6
7	6	8	7	0	95.0	-0.294	-0.190	KNOWN	247.8		152.8
8	8	10	0	0	30.0	22.980	14.826		248.0	KNOWN	218.0
9	11	7	9	12	80.0	-1.129	-0.729	KNOWN	249.0		169.0
10	9	103	0	0	100.0	9.887	6.379	KNOWN	253.9		153.9
11	14	93	13	0	50.0	-1.021	-0.659	KNOWN	244.8		194.8
12	14	15	34	0	80.0	-1.362	-0.878	KNOWN	248.9		168.9
13	16	50	90	15	125.0	-3.064	-1.976	KNOWN	247.3		122.3
14	17	2	46	0	30.0	-1.129	-0.729	KNOWN	235.8		205.8
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	240.3		220.3
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	239.7		219.7
17	21	22	24	23	20.0	-0.990	-0.639	KNOWN	240.1		220.1
18	10	22	92	0	40.0	-0.557	-0.359	KNOWN	246.0		206.0
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	236.6		216.6
20	26	25	41	0	20.0	-0.743	-0.479	KNOWN	236.5		216.5
21	27	95	28	0	20.0	-0.387	-0.250	KNOWN	235.2		215.2
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	232.7		212.7
23	28	29	44	0	20.0	-1.485	-0.958	KNOWN	231.1		211.1
24	35	33	0	0	20.0	-2.352	-1.517	KNOWN	217.2		197.2
25	35	37	0	0	20.0	-0.836	-0.539	KNOWN	217.0		197.0
26	37	38	40	42	20.0	-0.340	-0.220	KNOWN	217.3		197.3
27	38	39	0	0	20.0	-1.516	-0.978	KNOWN	216.1		196.1
28	32	33	48	0	25.0	-1.191	-0.769	KNOWN	229.3		204.3
29	40	39	0	0	20.0	-0.170	-0.110	KNOWN	216.8		196.8
30	44	42	43	0	20.0	-3.729	-2.406	KNOWN	229.0		209.0
31	46	48	49	0	40.0	-1.346	-0.868	KNOWN	233.8		193.8
32	52	53	49	54	95.0	-1.052	-0.679	KNOWN	238.0		143.0
33	54	55	56	0	110.0	-3.357	-2.166	KNOWN	232.6		122.6
34	58	55	57	60	75.0	-1.888	-1.218	KNOWN	231.4		156.4
35	56	57	62	61	80.0	-1.888	-1.218	KNOWN	230.1		150.1
36	62	63	75	0	80.0	-1.470	-0.948	KNOWN	229.8		149.8
37	61	63	64	66	75.0	-1.470	-0.948	KNOWN	225.3		150.3
38	64	70	69	65	60.0	-1.671	-1.078	KNOWN	216.4		156.4
39	70	71	73	72	20.0	-1.021	-0.659	KNOWN	221.7		201.7
40	71	68	0	0	20.0	-1.129	-0.729	KNOWN	212.8		192.8
41	75	73	76	74	70.0	-1.052	-0.679	KNOWN	229.8		159.8
42	72	76	77	0	40.0	4.279	2.761		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-0.836	-0.539	KNOWN	215.8		195.8
44	77	78	79	97	50.0	-3.357	-2.166	KNOWN	223.6		173.6
45	78	80	82	0	40.0	3.930	2.535	KNOWN	233.8		193.8
46	79	80	0	0	60.0	-3.497	-2.256	KNOWN	221.4		161.4
47	96	47	83	0	40.0	-1.470	-0.948	KNOWN	239.9		199.9
48	96	85	88	0	70.0	-0.217	-0.140	KNOWN	240.7		170.7
49	85	86	84	0	110.0	-0.217	-0.140	KNOWN	239.2		129.2
50	47	88	31	99	60.0	5.833	3.763	KNOWN	242.7		182.7
51	23	45	41	43	20.0	-17.762	-11.459	KNOWN	235.5		215.5
52	103	34	91	0	80.0	38.029	24.535		254.6	KNOWN	174.6
53	86	0	0	0	120.0	-1.052	-0.679	KNOWN	237.4		117.4
54	87	0	0	0	120.0	-2.305	-1.487	KNOWN	234.1		114.1
55	60	36	0	0	60.0	5.230	3.374	KNOWN	245.0		185.0
56	74	0	0	0	100.0	1.475	0.952		232.6	KNOWN	132.6
57	69	68	67	0	25.0	-1.671	-1.078	KNOWN	212.9		187.9
58	12	93	81	0	75.0	-0.340	-0.220	KNOWN	246.1		171.1
59	31	91	81	0	60.0	-0.340	-0.220	KNOWN	248.0		188.0
60	13	0	0	0	40.0	-0.851	-0.549	KNOWN	241.5		201.5
61	30	92	0	0	180.0	-0.418	-0.270	KNOWN	246.3		66.3
62	89	94	0	0	45.0	-0.851	-0.549	KNOWN	246.4		201.4
63	59	99	98	0	100.0	-1.470	-0.948	KNOWN	226.4		126.4
64	97	36	98	0	90.0	-2.182	-1.407	KNOWN	225.8		135.8
65	82	83	84	87	105.0	-1.888	-1.218	KNOWN	237.7		132.7
66	100	66	101	0	60.0	-0.418	-0.270	KNOWN	221.9		161.9
67	65	102	101	0	60.0	-0.418	-0.270	KNOWN	216.3		156.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.979	0.632
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.181	0.762
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.891	0.575
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.577	1.018
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.113	2.008
5	6	3	36.0	1800.0	60.0	0.0287	KNOWN	11.545	7.448
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.036	0.669
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.542	1.640
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	6.588	4.251
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.797	0.514
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	20.305	13.100
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	16.259	10.490
53	32	5	16.0	2000.0	75.0	0.7980	KNOWN	1.215	0.784
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.759	0.490
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.467	7.398
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.822	0.530
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	4.433	2.860
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.423	0.918
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.223	0.144
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	3.214	2.073
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	8.548	5.515
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	19.766	12.752
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	11.374	7.338
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.875	0.565
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	1.487	0.960
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.593	0.382
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.279	0.825
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.851	0.549
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	29.611	19.104
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	31.564	20.364
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.628	0.405
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.798	0.515
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.357	1.520
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.594	1.028
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.679	1.728
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	7.674	4.951
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	20.214	13.042
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.425	1.564
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	15.206	9.810
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.005	0.649
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.126	0.082
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.113	1.363
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.063	1.331
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.120	1.368
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.167	3.334
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.922	0.995
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.012	0.653
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.604	2.970
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.368	0.237
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.720	1.755
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.467	0.302
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.890	0.574
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.796	0.514
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.494	1.609
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.626	0.404
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.899	1.870
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.619	1.049
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.447	2.224
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	10.544	6.802
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.289	0.186
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.898	4.450
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.902	0.582
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.230	1.439
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.488	0.315
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	2.548	1.644
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.234	1.441
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.130	0.729
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.806	0.520
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	0.270	0.174
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.982	0.634
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.588	0.379
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.610	1.684
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.493	0.964
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.428	0.276
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.832	0.537
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.767	2.430
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.697	0.450
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.298	0.192
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	3.072	1.982
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	1.475	0.952
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.511	0.329
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.475	0.307
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.311	0.846
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.505	1.616
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.710	0.458
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.052	0.670
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.786	1.798
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.361	0.878
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.182	0.763
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.629	0.406
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.341	0.220
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.482	4.182
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.881	5.084
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	1.052	0.679
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.213	3.363
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.892	2.511
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.216	0.784
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	4.977	3.211
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.305	1.487
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.000	1.935
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.744	0.480
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.234	0.151
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.300	0.839

TABLE - SHS19

19:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.331	-0.858	KNOWN	243.3		128.3
2	1	3	4	0	60.0	-0.588	-0.379	KNOWN	246.1		186.1
3	3	5	2	18	40.0	-3.079	-1.986	KNOWN	245.3		205.3
4	51	50	52	0	110.0	-3.373	-2.176	KNOWN	241.0		131.0
5	51	53	58	0	140.0	-1.176	-0.759	KNOWN	237.7		97.7
6	4	5	6	11	40.0	-0.449	-0.289	KNOWN	247.2		207.2
7	6	8	7	0	95.0	-0.294	-0.190	KNOWN	248.5		153.5
8	8	10	0	0	30.0	23.968	15.463		248.8	KNOWN	218.8
9	11	7	9	12	80.0	-1.176	-0.759	KNOWN	249.6		169.6
10	9	103	0	0	100.0	9.577	6.179	KNOWN	254.1		154.1
11	14	93	13	0	50.0	-1.052	-0.679	KNOWN	244.7		194.7
12	14	15	34	0	80.0	-1.408	-0.908	KNOWN	249.2		169.2
13	16	50	90	15	125.0	-3.172	-2.046	KNOWN	247.7		122.7
14	17	2	46	0	30.0	-1.176	-0.759	KNOWN	236.6		206.6
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	241.3		221.3
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	240.7		220.7
17	21	22	24	23	20.0	-1.021	-0.659	KNOWN	241.0		221.0
18	10	22	92	0	40.0	-0.588	-0.379	KNOWN	246.8		206.8
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	237.6		217.6
20	26	25	41	0	20.0	-0.743	-0.479	KNOWN	237.6		217.6
21	27	95	28	0	20.0	-0.371	-0.240	KNOWN	236.5		216.5
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	234.1		214.1
23	28	29	44	0	20.0	-1.470	-0.948	KNOWN	232.6		212.6
24	35	33	0	0	20.0	-2.166	-1.397	KNOWN	220.7		200.7
25	35	37	0	0	20.0	-0.774	-0.499	KNOWN	220.5		200.5
26	37	38	40	42	20.0	-0.309	-0.200	KNOWN	220.8		200.8
27	38	39	0	0	20.0	-1.393	-0.898	KNOWN	219.8		199.8
28	32	33	48	0	25.0	-1.083	-0.699	KNOWN	231.2		206.2
29	40	39	0	0	20.0	-0.155	-0.100	KNOWN	220.4		200.4
30	44	42	43	0	20.0	-3.682	-2.376	KNOWN	230.7		210.7
31	46	48	49	0	40.0	-1.238	-0.799	KNOWN	235.0		195.0
32	52	53	49	54	95.0	-0.975	-0.629	KNOWN	238.7		143.7
33	54	55	56	0	110.0	-3.141	-2.026	KNOWN	233.2		123.2
34	58	55	57	60	75.0	-1.764	-1.138	KNOWN	232.5		157.5
35	56	57	62	61	80.0	-1.764	-1.138	KNOWN	230.4		150.4
36	62	63	75	0	80.0	-1.377	-0.888	KNOWN	230.0		150.0
37	61	63	64	66	75.0	-1.377	-0.888	KNOWN	226.8		151.8
38	64	70	69	65	60.0	-1.578	-1.018	KNOWN	218.0		158.0
39	70	71	73	72	20.0	-0.928	-0.599	KNOWN	222.7		202.7
40	71	68	0	0	20.0	-1.099	-0.709	KNOWN	214.6		194.6
41	75	73	76	74	70.0	-0.975	-0.629	KNOWN	229.9		159.9
42	72	76	77	0	40.0	3.401	2.194		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-0.774	-0.499	KNOWN	217.5		197.5
44	77	78	79	97	50.0	-3.311	-2.136	KNOWN	223.1		173.1
45	78	80	82	0	40.0	3.636	2.346	KNOWN	232.4		192.4
46	79	80	0	0	60.0	-3.636	-2.346	KNOWN	219.9		159.9
47	96	47	83	0	40.0	-1.377	-0.888	KNOWN	239.5		199.5
48	96	85	88	0	70.0	-0.201	-0.130	KNOWN	240.2		170.2
49	85	86	84	0	110.0	-0.201	-0.130	KNOWN	238.8		128.8
50	47	88	31	99	60.0	5.384	3.474	KNOWN	242.1		182.1
51	23	45	41	43	20.0	-17.499	-11.290	KNOWN	236.6		216.6
52	103	34	91	0	80.0	37.267	24.043		254.7	KNOWN	174.7
53	86	0	0	0	120.0	-0.975	-0.629	KNOWN	237.2		117.2
54	87	0	0	0	120.0	-2.166	-1.397	KNOWN	234.1		114.1
55	60	36	0	0	60.0	5.864	3.783	KNOWN	249.5		189.5
56	74	0	0	0	100.0	0.936	0.604		231.1	KNOWN	131.1
57	69	68	67	0	25.0	-1.578	-1.018	KNOWN	214.8		189.8
58	12	93	81	0	75.0	-0.356	-0.230	KNOWN	246.1		171.1
59	31	91	81	0	60.0	-0.356	-0.230	KNOWN	247.8		187.8
60	13	0	0	0	40.0	-0.882	-0.569	KNOWN	241.2		201.2
61	30	92	0	0	180.0	-0.449	-0.289	KNOWN	247.0		67.0
62	89	94	0	0	45.0	-0.882	-0.569	KNOWN	247.0		202.0
63	59	99	98	0	100.0	-1.594	-1.028	KNOWN	226.3		126.3
64	97	36	98	0	90.0	-2.274	-1.467	KNOWN	226.0		136.0
65	82	83	84	87	105.0	-1.764	-1.138	KNOWN	237.3		132.3
66	100	66	101	0	60.0	-0.387	-0.250	KNOWN	223.0		163.0
67	65	102	101	0	60.0	-0.387	-0.250	KNOWN	217.9		157.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.012	0.653
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.181	0.762
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.862	0.556
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.524	0.983
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.124	2.015
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	11.399	7.354
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.024	0.660
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.456	1.585
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	6.364	4.106
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.771	0.497
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	20.073	12.950
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	15.929	10.277
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	1.141	0.736
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.736	0.475
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.896	7.675
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.812	0.524
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	3.757	2.424
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.206	0.778
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.287	0.185
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	4.204	2.712
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	7.981	5.149
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	19.759	12.747
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	10.932	7.053
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.963	0.622
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	1.354	0.874
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.625	0.403
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.309	0.845
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.877	0.566
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	28.778	18.566
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	30.811	19.878
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.595	0.384
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.710	0.458
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.271	1.465
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.575	1.016
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.635	1.700
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	7.389	4.767
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	19.928	12.857
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.385	1.539
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	14.947	9.643
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	0.757	0.489
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.129	0.083
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.071	1.336
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.021	1.304
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.028	1.309
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	4.989	3.219
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.903	0.583
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.940	0.606
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.422	2.853
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.351	0.226
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.517	1.624
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.423	0.273
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.817	0.527
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.730	0.471
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.279	1.470
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.575	0.371
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.660	1.716
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.539	0.993
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.188	2.057
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	10.626	6.855
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.210	0.136
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	7.274	4.693
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	1.147	0.740
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.515	1.623
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.550	0.355
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	3.470	2.239
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.119	1.367
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.069	0.690
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.746	0.481
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	1.345	0.868
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.933	0.602
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.555	0.358
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.456	1.584
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.430	0.923
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.380	0.245
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.789	0.509
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.524	2.274
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.649	0.419
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.309	0.199
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	2.217	1.430
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	0.936	0.604
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.535	0.345
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.457	0.295
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.231	0.794
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.393	1.544
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.845	0.545
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.228	0.792
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.791	1.801
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.548	0.998
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.113	0.718
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.603	0.389
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.339	0.219
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.314	4.074
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.628	4.921
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.975	0.629
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.138	3.315
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	4.045	2.609
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.197	0.772
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.102	3.292
87	65	54	20.0	16000.0	130.0	0.7787	KNOWN	2.166	1.397
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.349	2.161
81	59	58	12.0	800.0	45.0	3.3085	KNOWN	0.702	0.453
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.154	0.099
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.237	0.798

TABLE - SHS20

20:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.176	-0.759	KNOWN	244.6		129.6
2	1	3	4	0	60.0	-0.526	-0.339	KNOWN	247.0		187.0
3	3	5	2	18	40.0	-2.754	-1.777	KNOWN	246.2		206.2
4	51	50	52	0	110.0	-3.017	-1.947	KNOWN	242.7		132.7
5	51	53	58	0	140.0	-1.037	-0.669	KNOWN	239.8		99.8
6	4	5	6	11	40.0	-0.387	-0.250	KNOWN	248.0		208.0
7	6	8	7	0	95.0	-0.263	-0.170	KNOWN	249.2		154.2
8	8	10	0	0	30.0	23.909	15.425		249.5	KNOWN	219.5
9	11	7	9	12	80.0	-1.052	-0.679	KNOWN	250.2		170.2
10	9	103	0	0	100.0	9.252	5.969	KNOWN	254.4		154.4
11	14	93	13	0	50.0	-1.114	-0.719	KNOWN	244.7		194.7
12	14	15	34	0	80.0	-1.501	-0.968	KNOWN	249.8		169.8
13	16	50	90	15	125.0	-3.373	-2.176	KNOWN	248.5		123.5
14	17	2	46	0	30.0	-1.052	-0.679	KNOWN	238.4		208.4
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	242.0		222.0
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	241.4		221.4
17	21	22	24	23	20.0	-0.913	-0.589	KNOWN	241.7		221.7
18	10	22	92	0	40.0	-0.526	-0.339	KNOWN	247.5		207.5
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	238.2		218.2
20	26	25	41	0	20.0	-0.758	-0.489	KNOWN	238.2		218.2
21	27	95	28	0	20.0	-0.371	-0.240	KNOWN	237.2		217.2
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	234.9		214.9
23	28	29	44	0	20.0	-1.501	-0.968	KNOWN	233.3		213.3
24	35	33	0	0	20.0	-2.182	-1.407	KNOWN	221.5		201.5
25	35	37	0	0	20.0	-0.789	-0.509	KNOWN	221.2		201.2
26	37	38	40	42	20.0	-0.309	-0.200	KNOWN	221.5		201.5
27	38	39	0	0	20.0	-1.408	-0.908	KNOWN	220.4		200.4
28	32	33	48	0	25.0	-1.083	-0.699	KNOWN	232.4		207.4
29	40	39	0	0	20.0	-0.155	-0.100	KNOWN	221.1		201.1
30	44	42	43	0	20.0	-3.744	-2.416	KNOWN	231.3		211.3
31	46	48	49	0	40.0	-1.253	-0.809	KNOWN	236.7		196.7
32	52	53	49	54	95.0	-0.851	-0.549	KNOWN	240.6		145.6
33	54	55	56	0	110.0	-2.754	-1.777	KNOWN	235.9		125.9
34	58	55	57	60	75.0	-1.547	-0.998	KNOWN	235.8		160.8
35	56	57	62	61	80.0	-1.547	-0.998	KNOWN	233.3		153.3
36	62	63	75	0	80.0	-1.207	-0.779	KNOWN	232.9		152.9
37	61	63	64	66	75.0	-1.207	-0.779	KNOWN	229.7		154.7
38	64	70	69	65	60.0	-1.377	-0.888	KNOWN	222.5		162.5
39	70	71	73	72	20.0	-0.944	-0.609	KNOWN	226.4		206.4
40	71	68	0	0	20.0	-1.114	-0.719	KNOWN	219.4		199.4
41	75	73	76	74	70.0	-0.851	-0.549	KNOWN	232.8		162.8
42	72	76	77	0	40.0	5.067	3.269		233.0	KNOWN	193.0
43	67	102	0	0	20.0	-0.789	-0.509	KNOWN	222.0		202.0
44	77	78	79	97	50.0	-3.373	-2.176	KNOWN	221.9		171.9
45	78	80	82	0	40.0	2.414	1.557	KNOWN	228.6		188.6
46	79	80	0	0	60.0	-3.590	-2.316	KNOWN	217.7		157.7
47	96	47	83	0	40.0	-1.207	-0.779	KNOWN	240.2		200.2
48	96	85	88	0	70.0	-0.170	-0.110	KNOWN	240.8		170.8
49	85	86	84	0	110.0	-0.170	-0.110	KNOWN	239.4		129.4
50	47	88	31	99	60.0	5.199	3.354	KNOWN	242.6		182.6
51	23	45	41	43	20.0	-17.809	-11.489	KNOWN	237.2		217.2
52	103	34	91	0	80.0	35.858	23.134		254.9	KNOWN	174.9
53	86	0	0	0	120.0	-0.851	-0.549	KNOWN	238.2		118.2
54	87	0	0	0	120.0	-1.888	-1.218	KNOWN	235.3		115.3
55	60	36	0	0	60.0	6.390	4.123	KNOWN	255.3		195.3
56	74	0	0	0	100.0	-1.444	-0.932		230.1	KNOWN	130.1
57	69	68	67	0	25.0	-1.377	-0.888	KNOWN	219.6		194.6
58	12	93	81	0	75.0	-0.371	-0.240	KNOWN	246.2		171.2
59	31	91	81	0	60.0	-0.371	-0.240	KNOWN	248.1		188.1
60	13	0	0	0	40.0	-0.944	-0.609	KNOWN	240.7		200.7
61	30	92	0	0	180.0	-0.387	-0.250	KNOWN	247.7		67.7
62	89	94	0	0	45.0	-0.944	-0.609	KNOWN	247.6		202.6
63	59	99	98	0	100.0	-1.563	-1.008	KNOWN	227.7		127.7
64	97	36	98	0	90.0	-2.228	-1.437	KNOWN	227.2		137.2
65	82	83	84	87	105.0	-1.547	-0.998	KNOWN	237.8		132.8
66	100	66	101	0	60.0	-0.340	-0.220	KNOWN	227.0		167.0
67	65	102	101	0	60.0	-0.340	-0.220	KNOWN	222.4		162.4

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.915	0.590
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.093	0.705
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.832	0.537
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.538	0.992
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.979	1.922
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	11.138	7.186
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.963	0.621
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.495	1.609
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	6.464	4.170
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.702	0.453
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	18.603	12.002
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	14.884	9.602
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.977	0.630
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.643	0.415
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.592	7.479
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.784	0.506
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	3.688	2.379
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.234	0.796
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.327	0.211
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	4.225	2.726
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	7.630	4.923
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	19.680	12.697
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	10.496	6.772
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	1.030	0.664
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	1.245	0.803
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.669	0.432
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.388	0.896
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.944	0.609
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	27.374	17.661
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	29.544	19.061
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.617	0.398
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.743	0.479
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.309	1.490
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.496	0.965
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.690	1.735
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	7.393	4.770
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	20.006	12.907
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.420	1.561
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	15.176	9.791
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	0.846	0.546
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.126	0.082
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.108	1.360
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.058	1.328
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.991	1.284
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.031	3.246
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.947	0.611
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.858	0.554
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.477	2.889
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.395	0.255
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.577	1.662
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.394	0.254
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.826	0.533
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.737	0.475
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.266	1.462
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.582	0.375
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.801	1.807
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.533	0.989
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.312	2.137
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	9.744	6.286
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.067	0.043
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.923	4.466
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	1.236	0.798
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.705	1.745
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.632	0.408
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	3.692	2.382
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.934	1.247
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.987	0.637
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.669	0.432
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	1.816	1.171
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.876	0.565
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.520	0.335
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.225	1.436
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.338	0.863
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.387	0.249
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.730	0.471
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.286	2.120
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.613	0.396
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.384	0.248
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	3.765	2.429
74	41	56	16.0	3000.0	70.0	1.3464	KNOWN	1.444	0.932
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.689	0.445
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.423	0.273
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.212	0.782
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.995	1.287
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.994	0.641
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.683	1.086
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.596	1.675
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.177	1.404
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	0.989	0.638
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.574	0.370
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.356	0.230
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.277	4.050
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.436	4.798
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.851	0.549
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.256	3.391
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.968	2.560
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.157	0.747
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.070	3.271
87	65	54	20.0	16000.0	130.0	0.7787	KNOWN	1.888	1.218
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.685	2.377
81	59	58	12.0	800.0	45.0	3.3085	KNOWN	0.730	0.471
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.226	0.146
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.166	0.752

TABLE - SHS21

21:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.129	-0.729	KNOWN	246.8		131.8
2	1	3	4	0	60.0	-0.511	-0.329	KNOWN	249.0		189.0
3	3	5	2	18	40.0	-2.646	-1.707	KNOWN	248.3		208.3
4	51	50	52	0	110.0	-2.909	-1.877	KNOWN	245.1		135.1
5	51	53	58	0	140.0	-0.913	-0.589	KNOWN	242.8		102.8
6	4	5	6	11	40.0	-0.371	-0.240	KNOWN	249.9		209.9
7	6	8	7	0	95.0	-0.248	-0.160	KNOWN	251.1		156.1
8	8	10	0	0	30.0	23.902	15.420		251.5	KNOWN	221.5
9	11	7	9	12	80.0	-1.006	-0.649	KNOWN	251.9		171.9
10	9	103	0	0	100.0	8.649	5.580	KNOWN	255.4		155.4
11	14	93	13	0	50.0	-1.068	-0.689	KNOWN	246.0		196.0
12	14	15	34	0	80.0	-1.439	-0.928	KNOWN	251.3		171.3
13	16	50	90	15	125.0	-3.234	-2.086	KNOWN	250.2		125.2
14	17	2	46	0	30.0	-1.006	-0.649	KNOWN	241.4		211.4
15	18	20	0	0	20.0	-0.170	-0.110	KNOWN	244.7		224.7
16	19	20	21	26	20.0	-0.170	-0.110	KNOWN	244.2		224.2
17	21	22	24	23	20.0	-0.882	-0.569	KNOWN	244.4		224.4
18	10	22	92	0	40.0	-0.511	-0.329	KNOWN	249.7		209.7
19	24	25	45	0	20.0	-0.170	-0.110	KNOWN	241.3		221.3
20	26	25	41	0	20.0	-0.712	-0.459	KNOWN	241.3		221.3
21	27	95	28	0	20.0	-0.340	-0.220	KNOWN	240.5		220.5
22	95	29	32	0	20.0	-0.170	-0.110	KNOWN	238.5		218.5
23	28	29	44	0	20.0	-1.423	-0.918	KNOWN	237.0		217.0
24	35	33	0	0	20.0	-1.996	-1.288	KNOWN	227.1		207.1
25	35	37	0	0	20.0	-0.712	-0.459	KNOWN	226.9		206.9
26	37	38	40	42	20.0	-0.279	-0.180	KNOWN	227.1		207.1
27	38	39	0	0	20.0	-1.284	-0.829	KNOWN	226.2		206.2
28	32	33	48	0	25.0	-0.990	-0.639	KNOWN	236.4		211.4
29	40	39	0	0	20.0	-0.139	-0.090	KNOWN	226.8		206.8
30	44	42	43	0	20.0	-3.528	-2.276	KNOWN	235.3		215.3
31	46	48	49	0	40.0	-1.129	-0.729	KNOWN	240.0		200.0
32	52	53	49	54	95.0	-0.758	-0.489	KNOWN	243.3		148.3
33	54	55	56	0	110.0	-2.445	-1.577	KNOWN	239.1		129.1
34	58	55	57	60	75.0	-1.377	-0.888	KNOWN	240.1		165.1
35	56	57	62	61	80.0	-1.377	-0.888	KNOWN	236.5		156.5
36	62	63	75	0	80.0	-1.068	-0.689	KNOWN	235.9		155.9
37	61	63	64	66	75.0	-1.068	-0.689	KNOWN	233.4		158.4
38	64	70	69	65	60.0	-1.238	-0.799	KNOWN	227.2		167.2
39	70	71	73	72	20.0	-0.851	-0.549	KNOWN	230.4		210.4
40	71	68	0	0	20.0	-1.052	-0.679	KNOWN	224.5		204.5
41	75	73	76	74	70.0	-0.758	-0.489	KNOWN	235.6		165.6
42	72	76	77	0	40.0	4.261	2.749		235.7	KNOWN	195.7
43	67	102	0	0	20.0	-0.712	-0.459	KNOWN	226.8		206.8
44	77	78	79	97	50.0	-3.187	-2.056	KNOWN	217.4		167.4
45	78	80	82	0	40.0	-1.377	-0.888	KNOWN	217.6		177.6
46	79	80	0	0	60.0	-2.445	-1.577	KNOWN	213.6		153.6
47	96	47	83	0	40.0	-1.068	-0.689	KNOWN	239.2		199.2
48	96	85	88	0	70.0	-0.155	-0.100	KNOWN	239.7		169.7
49	85	86	84	0	110.0	-0.155	-0.100	KNOWN	238.1		128.1
50	47	88	31	99	60.0	4.827	3.114	KNOWN	241.7		181.7
51	23	45	41	43	20.0	-16.787	-10.831	KNOWN	240.4		220.4
52	103	34	91	0	80.0	33.052	21.324		255.6	KNOWN	175.6
53	86	0	0	0	120.0	-0.758	-0.489	KNOWN	237.1		117.1
54	87	0	0	0	120.0	-1.686	-1.088	KNOWN	234.2		114.2
55	60	36	0	0	60.0	7.303	4.712	KNOWN	266.5		206.5
56	74	0	0	0	100.0	-1.909	-1.232		231.1	KNOWN	131.1
57	69	68	67	0	25.0	-1.238	-0.799	KNOWN	224.7		199.7
58	12	93	81	0	75.0	-0.356	-0.230	KNOWN	247.3		172.3
59	31	91	81	0	60.0	-0.356	-0.230	KNOWN	248.2		188.2
60	13	0	0	0	40.0	-0.897	-0.579	KNOWN	242.3		202.3
61	30	92	0	0	180.0	-0.371	-0.240	KNOWN	249.8		69.8
62	89	94	0	0	45.0	-0.897	-0.579	KNOWN	249.5		204.5
63	59	99	98	0	100.0	-1.068	-0.689	KNOWN	233.3		133.3
64	97	36	98	0	90.0	-1.532	-0.988	KNOWN	232.1		142.1
65	82	83	84	87	105.0	-1.377	-0.888	KNOWN	236.2		131.2
66	100	66	101	0	60.0	-0.294	-0.190	KNOWN	231.1		171.1
67	65	102	101	0	60.0	-0.294	-0.190	KNOWN	227.2		167.2

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.881	0.568
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.019	0.657
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.770	0.497
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.424	0.918
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.815	1.816
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	10.432	6.730
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.903	0.582
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.313	1.492
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	5.994	3.867
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.631	0.407
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	17.307	11.166
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	13.767	8.882
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.803	0.518
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.521	0.336
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.425	7.371
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.735	0.474
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	2.713	1.750
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	0.904	0.583
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.351	0.226
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	5.040	3.252
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	6.632	4.279
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	18.861	12.168
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	9.488	6.121
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	1.115	0.719
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	0.839	0.541
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.686	0.443
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.279	0.825
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.895	0.578
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	24.818	16.012
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	26.943	17.382
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.548	0.353
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.667	0.430
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.143	1.382
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.440	0.929
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.526	1.630
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	6.880	4.439
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	18.883	12.183
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.278	1.469
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	14.284	9.216
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	0.533	0.344
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.123	0.079
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	1.985	1.280
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	1.937	1.250
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.845	1.190
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	4.694	3.029
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.892	0.575
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.783	0.505
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.163	2.686
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.360	0.232
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.356	1.520
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.352	0.227
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.753	0.486
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.670	0.432
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.054	1.325
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.531	0.343
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.583	1.693
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.419	0.915
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.026	1.952
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	9.180	5.923
55	34	33	12.0	4800.0	60.0	11.6306	KNOWN	0.260	0.168
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.996	4.513
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	1.504	0.970
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	3.193	2.060
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.573	0.370
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	4.453	2.873
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.768	1.141
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.901	0.582
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.582	0.376
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	2.803	1.809
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.809	0.522
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.474	0.306
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	1.981	1.278
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.235	0.797
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.317	0.204
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.662	0.427
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	2.947	1.901
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.547	0.353
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.390	0.251
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	2.811	1.814
74	41	56	16.0	3000.0	70.0	1.3464	KNOWN	1.909	1.232
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.903	0.583
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.393	0.253
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.104	0.712
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	0.289	0.187
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.936	0.604
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	2.931	1.891
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	1.509	0.973
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	3.175	2.048
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	0.892	0.575
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.581	0.375
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.405	0.261
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.746	4.352
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.793	5.028
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.758	0.489
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.833	3.764
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	4.394	2.835
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	0.847	0.547
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.269	3.400
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	1.686	1.088
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	4.110	2.652
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.520	0.335
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.353	0.227
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.082	0.698

TABLE - SHS22

22:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.269	-0.819	KNOWN	248.7		133.7
2	1	3	4	0	60.0	-0.557	-0.359	KNOWN	251.3		191.3
3	3	5	2	18	40.0	-2.955	-1.907	KNOWN	250.8		210.8
4	51	50	52	0	110.0	-3.234	-2.086	KNOWN	247.5		137.5
5	51	53	58	0	140.0	-0.805	-0.519	KNOWN	245.6		105.6
6	4	5	6	11	40.0	-0.418	-0.270	KNOWN	252.2		212.2
7	6	8	7	0	95.0	-0.279	-0.180	KNOWN	253.5		158.5
8	8	10	0	0	30.0	25.715	16.591		254.2	KNOWN	224.2
9	11	7	9	12	80.0	-1.129	-0.729	KNOWN	253.9		173.9
10	9	103	0	0	100.0	8.340	5.380	KNOWN	256.4		156.4
11	14	93	13	0	50.0	-0.990	-0.639	KNOWN	248.6		198.6
12	14	15	34	0	80.0	-1.315	-0.848	KNOWN	253.1		173.1
13	16	50	90	15	125.0	-2.955	-1.907	KNOWN	252.2		127.2
14	17	2	46	0	30.0	-1.129	-0.729	KNOWN	244.0		214.0
15	18	20	0	0	20.0	-0.155	-0.100	KNOWN	248.1		228.1
16	19	20	21	26	20.0	-0.155	-0.100	KNOWN	247.7		227.7
17	21	22	24	23	20.0	-0.990	-0.639	KNOWN	248.1		228.1
18	10	22	92	0	40.0	-0.557	-0.359	KNOWN	252.4		212.4
19	24	25	45	0	20.0	-0.155	-0.100	KNOWN	245.6		225.6
20	26	25	41	0	20.0	-0.619	-0.399	KNOWN	245.6		225.6
21	27	95	28	0	20.0	-0.309	-0.200	KNOWN	244.6		224.6
22	95	29	32	0	20.0	-0.155	-0.100	KNOWN	242.9		222.9
23	28	29	44	0	20.0	-1.222	-0.789	KNOWN	241.8		221.8
24	35	33	0	0	20.0	-1.841	-1.188	KNOWN	232.8		212.8
25	35	37	0	0	20.0	-0.665	-0.429	KNOWN	232.6		212.6
26	37	38	40	42	20.0	-0.263	-0.170	KNOWN	232.8		212.8
27	38	39	0	0	20.0	-1.191	-0.769	KNOWN	232.1		212.1
28	32	33	48	0	25.0	-0.913	-0.589	KNOWN	240.4		215.4
29	40	39	0	0	20.0	-0.139	-0.090	KNOWN	232.5		212.5
30	44	42	43	0	20.0	-3.064	-1.976	KNOWN	240.4		220.4
31	46	48	49	0	40.0	-1.052	-0.679	KNOWN	243.2		203.2
32	52	53	49	54	95.0	-0.665	-0.429	KNOWN	246.0		151.0
33	54	55	56	0	110.0	-2.135	-1.378	KNOWN	242.2		132.2
34	58	55	57	60	75.0	-1.191	-0.769	KNOWN	243.3		168.3
35	56	57	62	61	80.0	-1.191	-0.769	KNOWN	239.7		159.7
36	62	63	75	0	80.0	-0.928	-0.599	KNOWN	239.1		159.1
37	61	63	64	66	75.0	-0.928	-0.599	KNOWN	237.2		162.2
38	64	70	69	65	60.0	-1.068	-0.689	KNOWN	232.2		172.2
39	70	71	73	72	20.0	-0.789	-0.509	KNOWN	234.6		214.6
40	71	68	0	0	20.0	-0.913	-0.589	KNOWN	230.1		210.1
41	75	73	76	74	70.0	-0.665	-0.429	KNOWN	238.6		168.6
42	72	76	77	0	40.0	2.923	1.886		238.7	KNOWN	198.7
43	67	102	0	0	20.0	-0.665	-0.429	KNOWN	231.8		211.8
44	77	78	79	97	50.0	-2.754	-1.777	KNOWN	226.5		176.5
45	78	80	82	0	40.0	-1.114	-0.719	KNOWN	226.7		186.7
46	79	80	0	0	60.0	-2.182	-1.407	KNOWN	223.4		163.4
47	96	47	83	0	40.0	-0.928	-0.599	KNOWN	243.2		203.2
48	96	85	88	0	70.0	-0.139	-0.090	KNOWN	243.6		173.6
49	85	86	84	0	110.0	-0.139	-0.090	KNOWN	242.4		132.4
50	47	88	31	99	60.0	4.131	2.665	KNOWN	245.2		185.2
51	23	45	41	43	20.0	-14.575	-9.403	KNOWN	244.9		224.9
52	103	34	91	0	80.0	27.381	17.665		256.3	KNOWN	176.3
53	86	0	0	0	120.0	-0.665	-0.429	KNOWN	241.6		121.6
54	87	0	0	0	120.0	-1.470	-0.948	KNOWN	239.4		119.4
55	60	36	0	0	60.0	6.622	4.272	KNOWN	266.0		206.0
56	74	0	0	0	100.0	-1.712	-1.104		235.0	KNOWN	135.0
57	69	68	67	0	25.0	-1.068	-0.689	KNOWN	230.3		205.3
58	12	93	81	0	75.0	-0.325	-0.210	KNOWN	249.7		174.7
59	31	91	81	0	60.0	-0.325	-0.210	KNOWN	250.4		190.4
60	13	0	0	0	40.0	-0.820	-0.529	KNOWN	245.5		205.5
61	30	92	0	0	180.0	-0.418	-0.270	KNOWN	252.2		72.2
62	89	94	0	0	45.0	-0.820	-0.529	KNOWN	251.8		206.8
63	59	99	98	0	100.0	-0.959	-0.619	KNOWN	238.6		138.6
64	97	36	98	0	90.0	-1.362	-0.878	KNOWN	238.0		148.0
65	82	83	84	87	105.0	-1.191	-0.769	KNOWN	240.9		135.9
66	100	66	101	0	60.0	-0.263	-0.170	KNOWN	235.3		175.3
67	65	102	101	0	60.0	-0.263	-0.170	KNOWN	232.1		172.1

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.960	0.619
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.031	0.665
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.722	0.466
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.233	0.796
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.750	1.774
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	9.704	6.261
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.898	0.580
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	1.973	1.273
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	5.110	3.297
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.578	0.373
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	16.573	10.692
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	12.762	8.233
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.703	0.453
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.476	0.307
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.830	7.633
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.688	0.444
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	0.264	0.170
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	0.470	0.303
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.377	0.243
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	7.143	4.608
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	4.968	3.205
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	18.574	11.983
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	7.852	5.066
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	1.067	0.688
103	10	52	24.0	2400.0	45.0	0.3386	KNOWN	0.487	0.314
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.624	0.403
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.186	0.765
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.820	0.529
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	21.262	13.717
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	23.201	14.968
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.443	0.286
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.491	0.317
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	1.818	1.173
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.625	1.048
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.155	1.390
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	6.243	4.028
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	17.129	11.051
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.003	1.292
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	12.511	8.072
92	18	61	20.0	1440.0	65.0	0.2500	KNOWN	0.888	0.573
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.133	0.086
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	1.715	1.106
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	1.669	1.077
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.736	1.120
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	4.198	2.708
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.739	0.477
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.843	0.544
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	3.714	2.396
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.288	0.186
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.129	1.374
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.377	0.244
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.701	0.452
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.630	0.406
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	1.971	1.272
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.491	0.317
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.199	1.419
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.321	0.852
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	2.760	1.781
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	8.633	5.570
55	34	33	12.0	4800.0	60.0	11.6306	KNOWN	0.272	0.176
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.770	4.368
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	1.488	0.960
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.943	1.899
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.468	0.302
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	4.676	3.017
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.583	1.021
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.808	0.521
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.497	0.321
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	3.250	2.097
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.726	0.468
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.426	0.275
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	1.707	1.101
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.071	0.691
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.294	0.190
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.573	0.369
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	2.591	1.672
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.478	0.308
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.340	0.220
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	1.718	1.108
74	41	56	16.0	3000.0	70.0	1.3464	KNOWN	1.712	1.104
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.727	0.469
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.337	0.217
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.002	0.647
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	0.290	0.187
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.832	0.537
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	2.568	1.657
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	1.350	0.871
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.754	1.777
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	0.775	0.500
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.506	0.326
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.352	0.227
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	5.868	3.786
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	6.782	4.375
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.665	0.429
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.063	3.267
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.899	2.515
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	0.743	0.479
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	4.668	3.012
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	1.470	0.948
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.679	2.374
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.444	0.287
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.251	0.162
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.971	0.626

TABLE - SHS23

23:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-1.052	-0.679	KNOWN	253.3		138.3
2	1	3	4	0	60.0	-0.464	-0.299	KNOWN	255.3		195.3
3	3	5	2	18	40.0	-2.491	-1.607	KNOWN	254.9		214.9
4	51	50	52	0	110.0	-2.723	-1.757	KNOWN	252.0		142.0
5	51	53	58	0	140.0	-0.634	-0.409	KNOWN	250.4		110.4
6	4	5	8	11	40.0	-0.356	-0.230	KNOWN	255.9		215.9
7	6	8	7	0	95.0	-0.232	-0.150	KNOWN	257.2		162.2
8	8	10	0	0	30.0	25.043	16.156		258.0	KNOWN	228.0
9	11	7	9	12	80.0	-0.944	-0.609	KNOWN	257.4		177.4
10	9	103	0	0	100.0	7.597	4.901	KNOWN	259.1		159.1
11	14	93	13	0	50.0	-0.866	-0.559	KNOWN	252.3		202.3
12	14	15	34	0	80.0	-1.145	-0.739	KNOWN	256.4		176.4
13	16	50	90	15	125.0	-2.599	-1.677	KNOWN	255.8		130.8
14	17	2	46	0	30.0	-0.944	-0.609	KNOWN	249.2		219.2
15	18	20	0	0	20.0	-0.139	-0.090	KNOWN	252.8		232.8
16	19	20	21	26	20.0	-0.139	-0.090	KNOWN	252.5		232.5
17	21	22	24	23	20.0	-0.820	-0.529	KNOWN	252.9		232.9
18	10	22	92	0	40.0	-0.464	-0.299	KNOWN	256.5		216.5
19	24	25	45	0	20.0	-0.139	-0.090	KNOWN	251.0		231.0
20	26	25	41	0	20.0	-0.526	-0.339	KNOWN	250.9		230.9
21	27	95	28	0	20.0	-0.263	-0.170	KNOWN	249.9		229.9
22	95	29	32	0	20.0	-0.139	-0.090	KNOWN	248.3		228.3
23	28	29	44	0	20.0	-1.068	-0.689	KNOWN	247.5		227.5
24	35	33	0	0	20.0	-1.826	-1.178	KNOWN	238.5		218.5
25	35	37	0	0	20.0	-0.650	-0.419	KNOWN	238.4		218.4
26	37	38	40	42	20.0	-0.263	-0.170	KNOWN	238.7		218.7
27	38	39	0	0	20.0	-1.176	-0.759	KNOWN	237.9		217.9
28	32	33	48	0	25.0	-0.913	-0.589	KNOWN	245.7		220.7
29	40	39	0	0	20.0	-0.124	-0.080	KNOWN	238.4		218.4
30	44	42	43	0	20.0	-2.677	-1.727	KNOWN	246.3		226.3
31	46	48	49	0	40.0	-1.037	-0.669	KNOWN	248.2		208.2
32	52	53	49	54	95.0	-0.526	-0.339	KNOWN	250.7		155.7
33	54	55	56	0	110.0	-1.702	-1.098	KNOWN	247.6		137.6
34	58	55	57	60	75.0	-0.959	-0.619	KNOWN	248.0		173.0
35	56	57	62	61	80.0	-0.959	-0.619	KNOWN	245.4		165.4
36	62	63	75	0	80.0	-0.743	-0.479	KNOWN	244.8		164.8
37	61	63	64	66	75.0	-0.743	-0.479	KNOWN	243.5		168.5
38	64	70	69	65	60.0	-0.851	-0.549	KNOWN	239.5		179.5
39	70	71	73	72	20.0	-0.774	-0.499	KNOWN	241.2		221.2
40	71	68	0	0	20.0	-0.805	-0.519	KNOWN	238.0		218.0
41	75	73	76	74	70.0	-0.526	-0.339	KNOWN	244.3		174.3
42	72	76	77	0	40.0	2.231	1.439		244.3	KNOWN	204.3
43	67	102	0	0	20.0	-0.650	-0.419	KNOWN	239.2		219.2
44	77	78	79	97	50.0	-2.414	-1.557	KNOWN	235.0		185.0
45	78	80	82	0	40.0	-0.774	-0.499	KNOWN	235.3		195.3
46	79	80	0	0	60.0	-1.810	-1.168	KNOWN	232.9		172.9
47	96	47	83	0	40.0	-0.743	-0.479	KNOWN	246.4		206.4
48	96	85	88	0	70.0	-0.108	-0.070	KNOWN	246.7		176.7
49	85	86	84	0	110.0	-0.108	-0.070	KNOWN	245.9		135.9
50	47	88	31	99	60.0	2.429	1.567	KNOWN	247.7		187.7
51	23	45	41	43	20.0	-12.687	-8.185	KNOWN	250.4		230.4
52	103	34	91	0	80.0	22.076	14.243		258.6	KNOWN	178.6
53	86	0	0	0	120.0	-0.526	-0.339	KNOWN	245.4		125.4
54	87	0	0	0	120.0	-1.176	-0.759	KNOWN	243.9		123.9
55	60	36	0	0	60.0	5.415	3.494	KNOWN	263.1		203.1
56	74	0	0	0	100.0	-1.865	-1.203		240.0	KNOWN	140.0
57	69	68	67	0	25.0	-0.851	-0.549	KNOWN	238.1		213.1
58	12	93	81	0	75.0	-0.294	-0.190	KNOWN	253.0		178.0
59	31	91	81	0	60.0	-0.294	-0.190	KNOWN	253.2		193.2
60	13	0	0	0	40.0	-0.712	-0.459	KNOWN	249.9		209.9
61	30	92	0	0	180.0	-0.356	-0.230	KNOWN	256.1		76.1
62	89	94	0	0	45.0	-0.712	-0.459	KNOWN	255.5		210.5
63	59	99	98	0	100.0	-0.789	-0.509	KNOWN	243.8		143.8
64	97	36	98	0	90.0	-1.129	-0.729	KNOWN	243.3		153.3
65	82	83	84	87	105.0	-0.959	-0.619	KNOWN	244.9		139.9
66	100	66	101	0	60.0	-0.217	-0.140	KNOWN	242.0		182.0
67	65	102	101	0	60.0	-0.217	-0.140	KNOWN	239.5		179.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.839	0.541
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	0.878	0.566
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.665	0.429
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.062	0.685
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.365	1.526
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	8.352	5.388
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.815	0.526
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	1.702	1.098
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	4.406	2.843
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.518	0.334
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	14.823	9.563
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	11.582	7.472
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.602	0.389
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.486	0.314
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.433	7.376
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.631	0.407
90	6	13	36.0	5000.0	70.0	0.0432	KNOWN	1.577	1.017
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	0.945	0.610
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.356	0.230
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	7.936	5.120
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	3.728	2.405
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	17.106	11.036
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	6.387	4.121
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	1.084	0.699
103	10	52	24.0	2400.0	45.0	0.3386	KNOWN	1.210	0.780
14	12	11	12.0	2800.0	45.0	10.7268	KNOWN	0.598	0.386
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	0.980	0.632
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.712	0.459
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	17.074	11.016
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	18.821	12.143
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.355	0.229
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.536	0.346
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	1.563	1.008
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.743	1.124
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	1.833	1.182
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	5.739	3.703
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	15.342	9.898
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	1.769	1.141
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	11.010	7.103
92	18	61	20.0	1440.0	65.0	0.2500	KNOWN	1.300	0.839
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.139	0.090
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	1.490	0.962
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	1.446	0.933
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.643	1.060
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	3.834	2.473
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.632	0.408
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.871	0.562
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	3.398	2.192
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.232	0.150
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.058	1.328
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.418	0.270
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.689	0.444
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.611	0.394
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	1.981	1.278
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.487	0.314
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.099	1.354
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.259	0.812
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	2.600	1.677
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	7.854	5.067
55	34	33	12.0	4800.0	60.0	11.6306	KNOWN	0.172	0.111
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.324	4.080
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	1.270	0.820
60	55	34	16.0	3600.0	50.0	3.0778	KNOWN	2.361	1.523
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.445	0.287
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	4.580	2.955
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.355	0.874
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.700	0.451
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.402	0.259
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	3.436	2.217
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.640	0.413
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.375	0.242
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	1.398	0.902
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	0.902	0.582
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.285	0.184
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.478	0.308
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	2.238	1.444
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.411	0.265
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.327	0.211
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	1.193	0.770
74	41	56	16.0	3000.0	70.0	1.3464	KNOWN	1.865	1.203
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.626	0.404
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.276	0.178
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	0.926	0.598
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	0.323	0.208
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.680	0.439
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	2.145	1.384
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	1.130	0.729
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.227	1.436
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	0.621	0.400
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.405	0.262
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.283	0.183
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	4.713	3.040
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	5.442	3.511
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.526	0.339
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	4.078	2.631
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.982	2.569
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	0.564	0.364
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	4.466	2.881
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	1.176	0.759
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.055	1.971
81	58	59	12.0	800.0	45.0	3.3005	KNOWN	0.190	0.122
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.220	0.142
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.858	0.553

TABLE - SHS24

24:00 HRS
STUDY DAY: THURSDAY, JUNE 23, 1966

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-0.959	-0.619	KNOWN	256.6		141.6
2	1	3	4	0	60.0	-0.433	-0.279	KNOWN	258.5		198.5
3	3	5	2	18	40.0	-2.243	-1.447	KNOWN	258.2		218.2
4	51	50	52	0	110.0	-2.460	-1.587	KNOWN	255.1		145.1
5	51	53	58	0	140.0	-0.526	-0.339	KNOWN	253.7		113.7
6	4	5	8	11	40.0	-0.325	-0.210	KNOWN	259.0		219.0
7	6	8	7	0	95.0	-0.217	-0.140	KNOWN	260.3		165.3
8	8	10	0	0	30.0	26.041	16.801		261.5	KNOWN	231.5
9	11	7	9	12	80.0	-0.851	-0.549	KNOWN	260.4		180.4
10	9	103	0	0	100.0	7.133	4.602	KNOWN	261.6		161.6
11	14	93	13	0	50.0	-0.805	-0.519	KNOWN	254.7		204.7
12	14	15	34	0	80.0	-1.068	-0.689	KNOWN	258.9		178.9
13	16	50	90	15	125.0	-2.414	-1.557	KNOWN	258.5		133.5
14	17	2	46	0	30.0	-0.851	-0.549	KNOWN	253.0		223.0
15	18	20	0	0	20.0	-0.124	-0.080	KNOWN	256.7		236.7
16	19	20	21	26	20.0	-0.124	-0.080	KNOWN	256.5		236.5
17	21	22	24	23	20.0	-0.743	-0.479	KNOWN	256.9		236.9
18	10	22	92	0	40.0	-0.433	-0.279	KNOWN	260.1		220.1
19	24	25	45	0	20.0	-0.124	-0.080	KNOWN	255.3		235.3
20	26	25	41	0	20.0	-0.495	-0.319	KNOWN	255.3		235.3
21	27	95	28	0	20.0	-0.248	-0.160	KNOWN	254.2		234.2
22	95	29	32	0	20.0	-0.124	-0.080	KNOWN	252.8		232.8
23	28	29	44	0	20.0	-0.959	-0.619	KNOWN	252.3		232.3
24	35	33	0	0	20.0	-1.640	-1.058	KNOWN	244.5		224.5
25	35	37	0	0	20.0	-0.588	-0.379	KNOWN	244.5		224.5
26	37	38	40	42	20.0	-0.232	-0.150	KNOWN	244.8		224.8
27	38	39	0	0	20.0	-1.052	-0.679	KNOWN	244.1		224.1
28	32	33	48	0	25.0	-0.820	-0.529	KNOWN	250.3		225.3
29	40	39	0	0	20.0	-0.124	-0.080	KNOWN	244.5		224.5
30	44	42	43	0	20.0	-2.414	-1.557	KNOWN	251.3		231.3
31	46	48	49	0	40.0	-0.944	-0.609	KNOWN	252.1		212.1
32	52	53	49	54	95.0	-0.449	-0.289	KNOWN	253.9		158.9
33	54	55	56	0	110.0	-1.423	-0.918	KNOWN	250.8		140.8
34	58	55	57	60	75.0	-0.789	-0.509	KNOWN	251.0		176.0
35	56	57	62	61	80.0	-0.789	-0.509	KNOWN	248.5		168.5
36	62	63	75	0	80.0	-0.619	-0.399	KNOWN	247.7		167.7
37	61	63	64	66	75.0	-0.619	-0.399	KNOWN	246.9		171.9
38	64	70	69	65	60.0	-0.696	-0.449	KNOWN	243.6		183.6
39	70	71	73	72	20.0	-0.696	-0.449	KNOWN	244.7		224.7
40	71	68	0	0	20.0	-0.712	-0.459	KNOWN	242.5		222.5
41	75	73	76	74	70.0	-0.449	-0.289	KNOWN	247.0		177.0
42	72	76	77	0	40.0	0.534	0.344		247.0	KNOWN	207.0
43	67	102	0	0	20.0	-0.588	-0.379	KNOWN	243.4		223.4
44	77	78	79	97	50.0	-2.166	-1.397	KNOWN	240.6		190.6
45	78	80	82	0	40.0	-0.526	-0.339	KNOWN	240.8		200.8
46	79	80	0	0	60.0	-1.547	-0.998	KNOWN	239.0		179.0
47	96	47	83	0	40.0	-0.619	-0.399	KNOWN	248.8		208.8
48	96	85	88	0	70.0	-0.093	-0.060	KNOWN	249.0		179.0
49	85	86	84	0	110.0	-0.093	-0.060	KNOWN	248.4		138.4
50	47	88	31	99	60.0	1.253	0.809	KNOWN	249.7		189.7
51	23	45	41	43	20.0	-11.434	-7.377	KNOWN	254.8		234.8
52	103	34	91	0	80.0	17.655	11.391		260.4	KNOWN	180.4
53	86	0	0	0	120.0	-0.449	-0.289	KNOWN	248.0		128.0
54	87	0	0	0	120.0	-0.975	-0.629	KNOWN	[illegible]		127.0
55	60	36	0	0	60.0	4.719	3.045	KNOWN	262.5		202.5
56	74	0	0	0	100.0	-1.542	-0.995		244.0	KNOWN	144.0
57	69	68	67	0	25.0	-0.696	-0.449	KNOWN	242.6		217.6
58	12	93	81	0	75.0	-0.279	-0.180	KNOWN	255.4		180.4
59	31	91	81	0	60.0	-0.279	-0.180	KNOWN	255.4		195.4
60	13	0	0	0	40.0	-0.665	-0.429	KNOWN	252.6		212.6
61	30	92	0	0	180.0	-0.325	-0.210	KNOWN	259.4		79.4
62	89	94	0	0	45.0	-0.665	-0.429	KNOWN	256.4		211.4
63	59	99	98	0	100.0	-0.681	-0.439	KNOWN	247.3		147.3
64	97	36	98	0	90.0	-0.975	-0.629	KNOWN	247.0		157.0
65	82	83	84	87	105.0	-0.789	-0.509	KNOWN	247.7		142.7
66	100	66	101	0	60.0	-0.186	-0.120	KNOWN	245.7		185.7
67	65	102	101	0	60.0	-0.186	-0.120	KNOWN	243.6		183.6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.814	0.525
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	0.758	0.489
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.612	0.395
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	0.881	0.568
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.128	1.373
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	7.295	4.706
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.771	0.497
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	1.439	0.928
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	3.723	2.402
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.489	0.316
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	13.964	9.009
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	11.015	7.106
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.552	0.356
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.515	0.332
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.830	7.633
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.619	0.400
90	6	13	36.0	5000.0	70.0	0.0432	KNOWN	3.710	2.394
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	1.457	0.940
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.449	0.290
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	9.518	6.140
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	2.529	1.632
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	16.524	10.660
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	5.176	3.340
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	1.177	0.759
103	10	52	24.0	2400.0	45.0	0.3386	KNOWN	1.956	1.262
14	12	11	12.0	2800.0	45.0	10.7268	KNOWN	0.600	0.387
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	0.870	0.561
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.665	0.429
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	13.642	8.801
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	15.310	9.877
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.216	0.139
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.532	0.343
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	1.315	0.848
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.930	1.245
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	1.588	1.024
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	5.256	3.391
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	14.309	9.231
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	1.620	1.045
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	10.016	6.462
92	18	61	20.0	1440.0	65.0	0.2500	KNOWN	1.782	1.150
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.175	0.113
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	1.321	0.852
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	1.268	0.818
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.531	0.988
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	3.478	2.244
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.541	0.349
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.865	0.558
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	3.060	1.974
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.179	0.115
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	1.819	1.173
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.409	0.264
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.619	0.399
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.557	0.359
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	1.817	1.173
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.433	0.279
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	1.773	1.144
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.171	0.755
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	2.185	1.410
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	7.829	5.051
55	34	33	12.0	4800.0	60.0	11.6306	KNOWN	0.113	0.073
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.518	4.205
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	1.239	0.800
60	55	34	16.0	3600.0	50.0	3.0778	KNOWN	2.041	1.316
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.415	0.268
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	5.123	3.305
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.219	0.787
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.627	0.405
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.310	0.200
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	4.193	2.705
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.576	0.372
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.334	0.216
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	1.126	0.727
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	0.773	0.499
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.233	0.150
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.399	0.258
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	1.878	1.212
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.344	0.222
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.312	0.202
76	41	42	36.0	2400.0	70.0	0.0208	KNOWN	0.315	0.203
74	41	56	16.0	3000.0	70.0	1.3464	KNOWN	1.542	0.995
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.514	0.332
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.235	0.152
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	0.823	0.531
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	0.351	0.226
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.570	0.368
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.872	1.208
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	[illegible]	[illegible]
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.854	1.196
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	0.517	0.333
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.338	0.218
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.235	0.152
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	3.924	2.531
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	4.533	2.925
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.449	0.289
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	3.382	2.182
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	4.052	2.614
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	0.434	0.280
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	4.302	2.775
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	0.975	0.629
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.678	1.728
81	58	59	12.0	800.0	45.0	3.3005	KNOWN	[illegible]	[illegible]
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.168	0.108
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.776	0.501

TABLE SHS-25
STUDY DAY: YEAR 2020
UNIMPROVED NETWORK

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-3.689	-2.380	KNOWN	234.8		119.8
2	1	3	4	0	60.0	-1.643	-1.060	KNOWN	252.4		192.4
3	3	5	2	18	40.0	-8.618	-5.560	KNOWN	250.6		210.6
4	51	50	52	0	110.0	-12.074	-7.790	KNOWN	239.1		129.1
5	51	53	58	0	140.0	-2.557	-1.650	KNOWN	232.7		92.7
6	4	5	6	11	40.0	-1.224	-0.790	KNOWN	257.0		217.0
7	6	8	7	0	95.0	-0.868	-0.560	KNOWN	264.4		169.4
8	8	10	0	0	30.0	64.419	41.560		270.0	KNOWN	240.0
9	11	7	9	12	80.0	-3.441	-2.220	KNOWN	265.6		185.6
10	9	103	0	0	100.0	20.723	13.370	KNOWN	275.2		175.2
11	14	93	13	0	50.0	-2.154	-1.390	KNOWN	241.6		191.6
12	14	15	34	0	80.0	-2.883	-1.860	KNOWN	259.3		179.3
13	16	50	90	15	125.0	-6.184	-3.990	KNOWN	256.6		131.6
14	17	2	46	0	30.0	-3.286	-2.120	KNOWN	209.1		179.1
15	18	20	0	0	20.0	-0.310	-0.200	KNOWN	241.3		221.3
16	19	20	21	26	20.0	-0.310	-0.200	KNOWN	240.1		220.1
17	21	22	24	23	20.0	-2.728	-1.760	KNOWN	244.2		224.2
18	10	22	92	0	40.0	-1.643	-1.060	KNOWN	261.9		221.9
19	24	25	45	0	20.0	-0.310	-0.200	KNOWN	235.7		215.7
20	26	25	41	0	20.0	-1.271	-0.820	KNOWN	235.5		215.5
21	27	95	28	0	20.0	-0.620	-0.400	KNOWN	222.5		202.5
22	95	29	32	0	20.0	-0.310	-0.200	KNOWN	210.8		190.8
23	28	29	44	0	20.0	-2.542	-1.640	KNOWN	207.2		187.2
24	35	33	0	0	20.0	-6.293	-4.060	KNOWN	116.8		96.8
25	35	37	0	0	20.0	-2.247	-1.450	KNOWN	116.3		96.3
26	37	38	40	42	20.0	-0.821	-0.530	KNOWN	119.9		99.9
27	38	39	0	0	20.0	-4.061	-2.620	KNOWN	112.5		92.5
28	32	33	48	0	25.0	-3.162	-2.040	KNOWN	183.9		158.9
29	40	39	0	0	20.0	-0.449	-0.290	KNOWN	117.0		97.0
30	44	42	43	0	20.0	-6.386	-4.120	KNOWN	199.3		179.3
31	46	48	49	0	40.0	-3.611	-2.330	KNOWN	206.7		166.7
32	52	53	49	54	95.0	-2.123	-1.370	KNOWN	235.4		140.4
33	54	55	56	0	110.0	-6.820	-4.400	KNOWN	233.0		123.0
34	58	55	57	60	75.0	-4.944	-3.190	KNOWN	230.4		155.4
35	56	57	62	61	80.0	-4.944	-3.190	KNOWN	233.0		153.0
36	62	63	75	0	80.0	-3.859	-2.490	KNOWN	238.6		158.6
37	61	63	64	66	75.0	-3.859	-2.490	KNOWN	207.7		132.7
38	64	70	69	65	60.0	-4.402	-2.840	KNOWN	158.8		98.8
39	70	71	73	72	20.0	-3.503	-2.260	KNOWN	194.1		174.1
40	71	68	0	0	20.0	-3.301	-2.130	KNOWN	135.0		115.0
41	75	73	76	74	70.0	-2.743	-1.770	KNOWN	252.8		182.8
42	72	76	77	0	40.0	35.669	23.012		265.0	KNOWN	225.0
43	67	102	0	0	20.0	-2.247	-1.450	KNOWN	154.9		134.9
44	77	78	79	97	50.0	-6.618	-4.270	KNOWN	170.4		120.4
45	78	80	82	0	40.0	6.138	3.960	KNOWN	193.5		153.5
46	79	80	0	0	60.0	-7.393	-4.770	KNOWN	153.0		93.0
47	96	47	83	0	40.0	-2.681	-1.730	KNOWN	221.4		181.4
48	96	85	88	0	70.0	-0.356	-0.230	KNOWN	224.0		154.0
49	85	86	84	0	110.0	-0.387	-0.250	KNOWN	217.2		107.2
50	47	88	31	99	60.0	13.345	8.610	KNOWN	232.7		172.7
51	23	45	41	43	20.0	-25.265	-16.300	KNOWN	233.8		213.8
52	103	34	91	0	80.0	48.911	31.556		270.0	KNOWN	190.0
53	86	0	0	0	120.0	-2.697	-1.740	KNOWN	206.9		86.9
54	87	0	0	0	120.0	-5.936	-3.830	KNOWN	189.7		69.7
55	60	36	0	0	60.0	11.578	7.470	KNOWN	278.7		218.7
56	74	0	0	0	100.0	3.428	2.211		266.0	KNOWN	166.0
57	69	68	67	0	25.0	-4.402	-2.840	KNOWN	136.1		111.1
58	12	93	81	0	75.0	-0.728	-0.470	KNOWN	246.6		171.6
59	31	91	81	0	80.0	-0.728	-0.470	KNOWN	249.8		189.8
60	13	0	0	0	40.0	-1.813	-1.170	KNOWN	228.2		188.2
61	30	92	0	0	180.0	-1.224	-0.790	KNOWN	258.3		78.3
62	89	94	0	0	45.0	-1.813	-1.170	KNOWN	254.9		209.9
63	59	99	98	0	100.0	-3.580	-2.310	KNOWN	183.3		83.3
64	97	36	98	0	90.0	-4.774	-3.080	KNOWN	182.6		92.6
65	82	83	84	87	105.0	-3.425	-2.210	KNOWN	210.5		105.5
66	100	66	101	0	60.0	-0.852	-0.550	KNOWN	190.0		130.0
67	65	102	101	0	60.0	-1.085	-0.700	KNOWN	158.3		98.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	2.700	1.742
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	2.780	1.793
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	1.790	1.155
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	2.440	1.574
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	6.783	4.376
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	22.236	14.346
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	2.375	1.532
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	3.812	2.460
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	9.870	6.367
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	1.096	0.707
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	33.703	21.744
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	20.533	13.247
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	1.933	1.247
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.472	0.304
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	30.102	19.421
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.635	1.055
90	6	13	36.0	5000.0	70.0	0.0432	KNOWN	3.598	2.321
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	2.994	1.932
89	6	62	16.0	3200.0	50.0	2.6764	KNOWN	0.895	0.577
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	22.089	14.251
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	8.882	5.730
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	42.330	27.309
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	16.358	10.554
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	2.400	1.549
103	10	52	24.0	2400.0	45.0	0.3386	KNOWN	4.365	2.816
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	1.310	0.845
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	2.658	1.715
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	1.814	1.170
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	39.989	25.800
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	44.183	28.505
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.919	0.593
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.879	0.567
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	3.502	2.260
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	6.176	3.985
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	3.265	2.106
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	15.973	10.305
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	36.467	23.527
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	3.894	2.512
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	23.669	15.270
92	18	61	20.0	1440.0	65.0	0.2500	KNOWN	4.219	2.722
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.675	0.436
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.908	1.876
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.669	1.722
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	4.840	3.123
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	10.513	6.783
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	1.445	0.932
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	3.086	1.991
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	9.416	6.075
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.568	0.366
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	6.861	4.426
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	1.680	1.084
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	2.383	1.538
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	2.127	1.372
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	7.012	4.524
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	1.678	1.082
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	6.937	4.476
43	51	30	16.0	3200.0	50.0	2.6764	KNOWN	3.982	2.569
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	9.669	6.238
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	6.807	4.391
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.438	0.283
56	35	33	30.0	3400.0	70.0	0.0715	KNOWN	0.452	0.291
57	35	34	16.0	4800.0	80.0	1.6827	KNOWN	1.250	0.806
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	4.419	2.851
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	1.634	1.054
62	36	35	30.0	1800.0	70.0	0.0378	KNOWN	14.904	9.616
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	5.493	3.544
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	2.765	1.784
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	2.266	1.462
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	21.029	13.567
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	2.470	1.593
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	1.430	0.922
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	7.310	4.716
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	4.088	2.637
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	1.290	0.832
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	2.315	1.494
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	10.917	7.043
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	2.212	1.427
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.986	0.636
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	31.263	20.169
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	3.428	2.212
77	42	44	12.0	6500.0	50.0	22.0678	KNOWN	2.195	1.416
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	1.300	0.839
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	3.547	2.289
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	3.901	2.517
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	2.126	1.372
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	2.648	1.709
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	5.268	3.398
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	3.031	1.955
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	2.182	1.408
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	1.312	0.847
83	47	65	12.0	5600.0	55.0	15.9398	KNOWN	0.813	0.524
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	14.665	9.461
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	17.203	11.099
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	2.697	1.740
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	11.580	7.471
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	7.379	4.761
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	2.209	1.425
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	9.094	5.867
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	5.937	3.830
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	7.160	4.619
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.986	0.636
98	63	64	12.0	2400.0	50.0	[illegible]	KNOWN	0.263	0.169
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	3.342	2.156

TABLE SHS-26
STUDY DAY: YEAR 2020
IMPROVED NETWORK

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD - FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-3.689	-2.380	KNOWN	259.0		144.0
2	1	3	4	0	60.0	-1.643	-1.060	KNOWN	263.5		203.5
3	3	5	2	18	40.0	-8.618	-5.560	KNOWN	263.0		223.0
4	51	50	52	0	110.0	-12.074	-7.790	KNOWN	258.2		148.2
5	51	53	58	0	140.0	-2.557	-1.650	KNOWN	256.3		116.3
6	4	5	6	11	40.0	-1.224	-0.790	KNOWN	264.5		224.5
7	6	8	7	0	95.0	-0.868	-0.560	KNOWN	267.6		172.6
8	8	10	0	0	30.0	70.960	45.785		270.0	KNOWN	240.0
9	11	7	9	12	80.0	-3.441	-2.220	KNOWN	267.9		187.9
10	9	103	0	0	100.0	20.723	13.370	KNOWN	270.3		170.3
11	14	93	13	0	50.0	-2.155	-1.390	KNOWN	264.7		214.7
12	14	15	34	0	80.0	-2.883	-1.860	KNOWN	265.0		185.0
13	16	50	90	15	125.0	-6.184	-3.990	KNOWN	263.8		138.8
14	17	2	46	0	30.0	-3.286	-2.120	KNOWN	251.2		221.2
15	18	20	0	0	20.0	-0.310	-0.200	KNOWN	260.8		240.8
16	19	20	21	26	20.0	-0.310	-0.200	KNOWN	260.5		240.5
17	21	22	24	23	20.0	-2.728	-1.760	KNOWN	261.6		241.6
18	10	22	92	0	40.0	-1.643	-1.060	KNOWN	267.2		227.2
19	24	25	45	0	20.0	-0.310	-0.200	KNOWN	259.2		239.2
20	26	25	41	0	20.0	-1.271	-0.820	KNOWN	259.1		239.1
21	27	95	28	0	20.0	-0.620	-0.400	KNOWN	258.1		238.1
22	95	29	32	0	20.0	-0.310	-0.200	KNOWN	256.1		236.1
23	28	29	44	0	20.0	-2.542	-1.640	KNOWN	256.0		236.0
24	35	33	0	0	20.0	-6.293	-4.060	KNOWN	226.0		206.0
25	35	37	0	0	20.0	-2.247	-1.450	KNOWN	226.0		206.0
26	37	38	40	42	20.0	-0.821	-0.530	KNOWN	227.7		207.7
27	38	39	0	0	20.0	-4.061	-2.620	KNOWN	225.5		205.5
28	32	33	48	0	25.0	-3.162	-2.040	KNOWN	245.7		220.7
29	40	39	0	0	20.0	-0.450	-0.290	KNOWN	226.9		206.9
30	44	42	43	0	20.0	-6.386	-4.120	KNOWN	254.4		234.4
31	46	48	49	0	40.0	-3.611	-2.330	KNOWN	250.5		210.5
32	52	53	49	54	95.0	-2.123	-1.370	KNOWN	257.3		162.3
33	54	55	56	0	110.0	-6.820	-4.400	KNOWN	256.5		146.5
34	58	55	57	60	75.0	-4.944	-3.190	KNOWN	255.2		180.2
35	56	57	62	61	80.0	-4.944	-3.190	KNOWN	256.5		176.5
36	62	63	75	0	80.0	-3.859	-2.490	KNOWN	257.8		177.8
37	61	63	64	66	75.0	-3.859	-2.490	KNOWN	252.0		177.0
38	64	70	69	65	60.0	-4.402	-2.840	KNOWN	247.7		187.7
39	70	71	73	72	20.0	-3.503	-2.260	KNOWN	253.3		233.3
40	71	68	0	0	20.0	-3.301	-2.130	KNOWN	243.7		223.7
41	75	73	76	74	70.0	-2.743	-1.770	KNOWN	261.4		191.4
42	72	76	77	0	40.0	36.181	23.342		265.0	KNOWN	225.0
43	67	102	0	0	20.0	-2.247	-1.450	KNOWN	246.6		226.6
44	77	78	79	97	50.0	-6.618	-4.270	KNOWN	240.7		190.7
45	78	80	82	0	40.0	6.138	3.960	KNOWN	250.0		210.0
46	79	80	0	0	60.0	-7.394	-4.770	KNOWN	230.6		170.6
47	96	47	83	0	40.0	-2.682	-1.730	KNOWN	259.7		219.7
48	96	85	88	0	70.0	-0.356	-0.230	KNOWN	260.1		190.1
49	85	86	84	0	110.0	-0.387	-0.250	KNOWN	255.6		145.6
50	47	88	31	99	60.0	13.346	8.610	KNOWN	260.0		200.0
51	23	45	41	43	20.0	-25.265	-16.300	KNOWN	258.6		238.6
52	103	34	91	0	80.0	41.549	26.806		270.0	KNOWN	190.0
53	86	0	0	0	120.0	-2.697	-1.740	KNOWN	246.8		126.8
54	87	0	0	0	120.0	-5.936	-3.830	KNOWN	232.2		112.2
55	60	36	0	0	60.0	11.578	7.470	KNOWN	261.4		201.4
56	74	0	0	0	100.0	3.731	2.407		266.0	KNOWN	166.0
57	69	68	67	0	25.0	-4.402	-2.840	KNOWN	244.0		219.0
58	12	93	81	0	75.0	-0.728	-0.470	KNOWN	265.8		190.8
59	31	91	81	0	60.0	-0.728	-0.470	KNOWN	267.5		207.5
60	13	0	0	0	40.0	-1.813	-1.170	KNOWN	263.0		223.0
61	30	92	0	0	180.0	-1.224	-0.790	KNOWN	265.4		85.4
62	89	94	0	0	45.0	-1.813	-1.170	KNOWN	263.7		218.7
63	59	99	98	0	100.0	-3.580	-2.310	KNOWN	244.8		144.8
64	97	36	98	0	90.0	-4.774	-3.080	KNOWN	244.1		154.1
65	82	83	84	87	105.0	-3.426	-2.210	KNOWN	251.6		146.6
66	100	66	101	0	60.0	-0.853	-0.550	KNOWN	250.7		190.7
67	65	102	101	0	60.0	-1.085	-0.700	KNOWN	247.3		187.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	3.146	2.030
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	2.355	1.519
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	1.812	1.169
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	2.146	1.384
4	6	2	24.0	1600.0	135.0	0.0296	KNOWN	6.935	4.474
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	22.758	14.682
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	2.502	1.614
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	3.432	2.214
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	10.352	6.679
51	4	5	12.0	1900.0	135.0	1.0270	KNOWN	1.395	0.900
50	13	4	36.0	3400.0	135.0	0.0087	KNOWN	32.626	21.049
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	19.157	12.359
53	32	5	16.0	2000.0	135.0	0.2663	KNOWN	1.964	1.267
58	5	34	12.0	3200.0	135.0	1.7297	KNOWN	0.801	0.517
6	7	6	36.0	1760.0	135.0	0.0045	KNOWN	33.590	21.671
11	9	6	16.0	3400.0	135.0	0.4527	KNOWN	2.936	1.894
90	6	13	36.0	5000.0	135.0	0.0128	KNOWN	9.095	5.868
30	61	6	24.0	2400.0	135.0	0.0444	KNOWN	4.910	3.168
89	6	62	16.0	3200.0	135.0	0.4261	KNOWN	1.425	0.919
8	8	7	36.0	2400.0	135.0	0.0062	KNOWN	25.263	16.298
7	9	7	36.0	1920.0	135.0	0.0049	KNOWN	9.195	5.933
10	8	18	42.0	1920.0	135.0	0.0023	KNOWN	45.704	29.486
9	10	9	36.0	4700.0	135.0	0.0121	KNOWN	17.725	11.436
12	9	58	16.0	3700.0	135.0	0.4927	KNOWN	2.153	1.389
103	10	52	24.0	2400.0	135.0	0.0444	KNOWN	2.998	1.934
14	12	11	12.0	2600.0	135.0	1.4054	KNOWN	0.446	0.288
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	3.522	2.272
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	1.813	1.170
15	12	13	48.0	3200.0	135.0	0.0020	KNOWN	32.459	20.941
34	52	12	48.0	10400.0	135.0	0.0066	KNOWN	35.788	23.089
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	0.389	0.251
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	1.028	0.663
20	15	16	20.0	800.0	135.0	0.0359	KNOWN	3.122	2.014
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	8.191	5.285
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	3.278	2.115
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	18.076	11.662
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	37.926	24.468
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	3.812	2.459
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	23.195	14.964
92	18	61	20.0	1440.0	135.0	0.0847	KNOWN	6.135	3.958
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.637	0.411
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	2.865	1.848
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	2.644	1.706
95	21	22	16.0	750.0	135.0	0.0999	KNOWN	5.066	3.269
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	12.390	7.994
29	22	23	16.0	3050.0	135.0	0.4061	KNOWN	0.604	0.390
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	4.152	2.679
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	10.452	6.743
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	0.075	0.048
33	28	24	16.0	4800.0	135.0	0.6392	KNOWN	6.368	4.108
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	2.173	1.402
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	2.383	1.538
40	26	29	16.0	1600.0	135.0	0.2131	KNOWN	2.127	1.372
42	30	26	16.0	4800.0	135.0	0.6392	KNOWN	7.505	4.842
39	29	27	16.0	3840.0	135.0	0.5113	KNOWN	1.678	1.082
48	31	28	16.0	1600.0	135.0	0.2131	KNOWN	5.378	3.469
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	3.439	2.218
49	32	31	22.0	5120.0	135.0	0.1446	KNOWN	7.961	5.136
54	32	33	30.0	3300.0	135.0	0.0206	KNOWN	7.108	4.586
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.688	0.444
56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	0.393	0.253
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	1.468	0.947
60	55	34	16.0	3680.0	135.0	0.4900	KNOWN	3.932	2.537
59	34	63	12.0	5600.0	135.0	3.0270	KNOWN	1.945	1.255
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	13.073	8.434
61	35	37	16.0	2400.0	135.0	0.3196	KNOWN	4.149	2.677
100	35	66	12.0	2700.0	135.0	1.4594	KNOWN	2.111	1.362
63	36	37	12.0	2000.0	135.0	1.0811	KNOWN	2.470	1.593
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	19.402	12.517
64	37	38	12.0	2700.0	135.0	1.4594	KNOWN	1.795	1.158
66	37	66	12.0	2700.0	135.0	1.4594	KNOWN	0.965	0.622
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	9.088	5.863
69	38	57	16.0	2000.0	135.0	0.2663	KNOWN	4.157	2.682
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	2.324	1.499
71	39	40	12.0	3680.0	135.0	1.9892	KNOWN	2.332	1.505
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	12.666	8.172
72	42	39	12.0	4800.0	135.0	2.5946	KNOWN	2.257	1.456
68	57	40	16.0	2000.0	135.0	0.2663	KNOWN	0.970	0.626
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	31.080	20.052
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	3.731	2.407
77	42	44	12.0	6500.0	135.0	3.5135	KNOWN	2.843	1.834
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	1.214	0.783
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	3.462	2.233
78	45	44	16.0	8000.0	135.0	1.0653	KNOWN	3.227	2.082
79	44	46	16.0	9600.0	135.0	1.2783	KNOWN	3.050	1.967
97	64	44	16.0	2400.0	135.0	0.3196	KNOWN	3.598	2.321
80	45	46	16.0	9600.0	135.0	1.2783	KNOWN	4.344	2.803
82	65	45	16.0	6240.0	135.0	0.8309	KNOWN	1.433	0.925
96	48	47	16.0	900.0	135.0	0.1198	KNOWN	2.023	1.305
47	50	47	12.0	2400.0	135.0	1.2973	KNOWN	2.357	1.520
83	47	65	12.0	5600.0	135.0	3.0270	KNOWN	1.698	1.096
85	48	49	24.0	2400.0	135.0	0.0444	KNOWN	12.181	7.859
88	50	48	24.0	2240.0	135.0	0.0414	KNOWN	14.561	9.394
86	49	53	16.0	11500.0	135.0	1.5313	KNOWN	2.697	1.740
84	49	65	24.0	3600.0	135.0	0.0665	KNOWN	9.097	5.869
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	5.933	3.828
99	50	63	12.0	8000.0	135.0	4.3243	KNOWN	2.361	1.523
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	8.760	5.651
87	65	54	20.0	16000.0	135.0	0.7187	KNOWN	5.936	3.830
36	55	64	16.0	3000.0	135.0	3.3995	KNOWN	7.646	4.933
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	2.098	1.354
98	63	64	12.0	2400.0	135.0	1.2973	KNOWN	0.725	0.468
101	66	67	12.0	1400.0	135.0	0.7567	KNOWN	2.223	1.434

TABLE SHS-27
STUDY DAY: 1972 OPERATION
FIRE NEAR NODE 43
TOTAL HEAD = 135 FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	235.0		120.0
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	239.7		179.7
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	238.7		198.7
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	235.8		125.8
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	232.7		92.7
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	241.3		201.3
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	242.5		147.5
8	8	10	0	0	30.0	22.069	14.238		242.5	KNOWN	212.5
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	244.0		164.0
10	9	103	0	0	100.0	9.939	6.412		250.6	KNOWN	150.6
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	240.7		190.7
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	245.7		165.7
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	243.5		118.5
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	227.0		197.0
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	234.2		214.2
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	233.6		213.6
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	234.0		214.0
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	240.4		200.4
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	230.5		210.5
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	230.5		210.5
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	228.6		208.6
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	225.6		205.6
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	224.1		204.1
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	205.5		185.5
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	205.3		185.3
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	205.8		185.8
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	204.3		184.3
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	220.9		195.9
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	205.2		185.2
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	221.8		201.8
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	226.6		186.6
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	233.5		138.5
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	229.3		119.3
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	228.4		153.4
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	227.3		147.3
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	227.3		147.3
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	213.6		138.6
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	162.7		102.7
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	193.4		173.4
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	156.4		136.4
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	228.0		158.0
42	72	76	77	0	40.0	14.081	9.084		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-10.379	-6.696		135.0	KNOWN	115.0
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	218.9		168.9
45	78	80	82	0	40.0	2.247	1.450	KNOWN	226.2		186.2
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	216.4		156.4
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	239.1		199.1
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	239.8		169.8
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	238.2		128.2
50	47	88	31	99	60.0	6.153	3.970	KNOWN	241.8		181.8
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	229.5		209.5
52	103	34	91	0	80.0	46.872	30.240		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	236.8		116.8
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	233.6		113.6
55	104	60	36	0	60.0	4.938	3.186		240.0	KNOWN	180.0
56	74	0	0	0	100.0	1.245	0.803		230.0	KNOWN	130.0
57	69	58	67	0	25.0	-1.472	-0.950	KNOWN	155.8		130.8
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	242.3		167.3
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	246.6		186.6
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	236.5		196.5
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	240.7		60.7
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	241.3		196.3
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	223.5		123.5
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	222.1		132.1
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	236.4		131.4
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	192.1		132.1
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	153.9		93.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.324	0.854
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.675	1.081
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.953	0.615
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.685	1.087
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.923	2.531
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	13.622	8.789
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.203	0.776
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.593	1.673
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	6.721	4.336
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.739	0.477
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	21.648	13.966
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	15.671	10.111
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.001	0.001
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	1.026	0.662
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.665	0.429
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	10.978	7.083
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.875	0.565
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	8.237	5.314
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.934	1.248
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.070	0.045
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	1.477	0.953
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	9.988	6.444
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	20.629	13.309
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	13.359	8.619
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.667	0.430
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	3.420	2.206
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.668	0.431
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.440	0.929
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	36.017	23.237
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	38.204	24.648
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.032	0.666
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.327	0.211
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.407	1.553
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.792	1.156
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.639	1.703
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	8.095	5.223
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	20.966	13.526
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.422	1.562
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	15.156	9.778
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.251	0.807
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.134	0.086
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.091	1.349
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.040	1.316
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.301	1.484
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.423	3.498
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.912	0.588
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.203	0.776
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.862	3.137
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.372	0.240
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.100	2.000
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.604	0.390
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.945	1.900
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.261	2.104
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.772	1.143
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	4.500	2.903
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	9.231	5.955
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.244	0.158
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.041	3.898
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.812	0.524
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.045	1.320
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.484	0.312
62	36	35	30.0	1800.0	70.0	0.0378	KNOWN	1.225	0.791
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	3.938	2.541
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	2.482	1.601
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	1.460	0.942
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	3.976	2.565
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	2.525	1.629
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	1.588	1.024
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	6.779	4.373
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	2.151	1.388
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	5.680	3.664
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	1.797	1.159
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	8.206	5.294
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	1.548	0.999
68	40	57	16.0	2000.0	60.0	1.1938	KNOWN	0.701	0.452
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	11.843	7.641
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	1.244	0.803
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.690	0.445
67	57	43	12.0	3400.0	50.0	11.5431	KNOWN	1.374	0.886
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	9.005	5.810
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.096	1.352
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.745	0.481
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.277	0.824
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.448	1.580
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.296	1.482
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.054	0.680
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.613	0.395
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.380	0.245
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.706	4.326
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.946	5.126
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.606	3.616
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.700	2.387
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.295	0.835
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.248	3.386
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.030	1.310
36	55	64	16.0	3900.0	50.0	2.5091	KNOWN	2.892	1.866
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	1.161	0.749
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.384	0.248
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	3.697	2.385

TABLE SHS-28
STUDY DAY: 1972 OPERATION
FIRE NEAR NODE 46
TOTAL HEAD = 175 FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	234.9		119.9
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	239.6		179.6
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	238.7		198.7
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	235.7		125.7
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	232.5		92.5
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	241.3		201.3
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	242.5		147.5
8	8	10	0	0	30.0	22.307	14.391		242.5	KNOWN	212.5
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	244.0		164.0
10	9	103	0	0	100.0	10.001	6.453		250.6	KNOWN	150.6
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	239.4		189.4
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	245.7		165.7
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	243.4		118.4
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	226.9		196.9
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	234.2		214.2
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	233.6		213.6
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	234.0		214.0
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	240.4		200.4
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	230.5		210.5
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	230.5		210.5
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	228.6		208.6
22	95	29	32	0	20.0	-0.185	-0.120	KNOWN	225.6		205.6
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	224.1		204.1
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	205.5		185.5
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	205.3		185.3
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	205.8		185.8
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	204.2		184.2
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	220.9		195.9
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	205.2		185.2
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	221.7		201.7
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	226.5		186.5
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	233.4		138.4
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	229.1		119.1
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	227.8		152.8
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	227.1		147.1
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	227.2		147.2
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	213.5		138.5
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	162.6		102.6
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	193.3		173.3
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	156.3		136.3
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	227.9		157.9
42	72	76	77	0	40.0	14.836	9.571		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-10.379	-6.696	KNOWN	135.6		115.6
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	196.5		146.5
45	78	80	82	0	40.0	2.247	1.450	KNOWN	201.8		161.8
46	79	80	0	0	60.0	-6.593	-4.254		175.0	KNOWN	115.0
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	230.9		190.9
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	231.6		161.6
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	229.3		119.3
50	47	88	31	99	60.0	6.153	3.970	KNOWN	234.3		174.3
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	229.5		209.5
52	103	34	91	0	80.0	48.148	31.063		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	227.9		107.9
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	223.9		103.9
55	104	60	36	0	60.0	5.991	3.865		240.0	KNOWN	180.0
56	74	0	0	0	100.0	1.264	0.816		230.0	KNOWN	130.0
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	155.7		130.7
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	240.9		165.9
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	243.3		183.3
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	235.3		195.3
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	240.7		60.7
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	241.3		196.3
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	214.3		114.3
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	209.0		119.0
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	226.8		121.8
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	191.9		131.9
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	153.8		93.8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.326	0.856
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.675	1.080
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.955	0.616
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.683	1.086
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.924	2.532
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	13.622	8.788
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.206	0.778
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.592	1.672
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	6.718	4.334
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.747	0.482
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	21.722	14.014
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	15.737	10.153
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.002	0.001
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	1.055	0.680
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.701	0.452
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.027	7.114
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.868	0.560
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	8.188	5.283
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.921	1.239
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.065	0.042
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.065	0.042
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	1.655	1.068
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	9.822	6.337
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	20.652	13.324
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	13.421	8.659
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.902	0.582
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	3.420	2.206
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.748	0.482
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.360	0.878
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	36.037	23.249
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	38.303	24.712
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.026	0.662
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.332	0.214
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.406	1.552
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.800	1.161
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.638	1.702
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	8.100	5.226
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	20.976	13.533
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.422	1.562
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	15.158	9.779
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.239	0.800
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.144	0.093
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.091	1.349
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.039	1.315
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.304	1.486
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.424	3.500
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.911	0.587
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.207	0.779
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.862	3.137
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.371	0.239
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.099	1.999
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.606	0.391
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.946	1.901
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.255	2.100
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.773	1.144
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	4.489	2.896
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	9.279	5.986
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.306	0.198
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	6.028	3.889
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.618	0.399
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.101	1.356
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.832	0.537
62	36	35	30.0	1800.0	70.0	0.0378	KNOWN	1.430	0.923
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	3.936	2.540
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	2.481	1.600
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	1.461	0.942
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	4.177	2.695
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	2.523	1.628
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	1.587	1.024
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	6.781	4.375
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	2.148	1.386
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	5.684	3.667
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	1.797	1.159
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	8.206	5.294
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	1.550	1.000
68	40	57	16.0	2000.0	60.0	1.1938	KNOWN	0.696	0.449
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	12.033	7.763
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	1.264	0.816
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	1.253	0.809
67	57	43	12.0	3400.0	50.0	11.5431	KNOWN	1.350	0.871
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	8.820	5.690
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.761	1.136
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	2.381	1.536
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	2.684	1.732
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	4.212	2.718
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	3.726	2.404
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.073	0.692
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.694	0.448
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.481	0.310
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	8.034	5.183
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	9.293	5.996
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.914	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	6.934	4.473
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	5.192	3.350
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.358	0.876
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	6.425	4.145
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3900.0	50.0	2.5091	KNOWN	3.889	2.509
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.846	0.546
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.795	0.513
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	3.696	2.384

TABLE SHS-29
STUDY DAY: 1972 OPERATION
FIRE NEAR NODE 30
TOTAL HEAD = 135 FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	230.8		115.8
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	236.6		176.6
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	234.3		194.3
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	233.1		123.1
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	229.7		89.7
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	239.3		199.3
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	241.8		146.8
8	8	10	0	0	30.0	37.502	24.195		242.5	KNOWN	212.5
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	243.4		163.4
10	9	103	0	0	100.0	10.585	6.829		250.6	KNOWN	150.6
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	238.9		188.9
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	244.5		164.5
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	241.9		116.9
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	215.3		185.3
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	222.4		202.4
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	220.6		200.6
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	225.1		205.1
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	238.1		198.1
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	219.0		199.0
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	218.8		198.8
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	194.3		174.3
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	186.8		166.8
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	162.3		142.3
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	145.5		125.5
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	137.5		117.5
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	134.1		114.1
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	132.5		112.5
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	187.6		162.6
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	133.5		113.5
30	44	42	43	0	20.0	-23.980	-15.471		135.0	KNOWN	115.0
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	211.9		171.9
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	230.4		135.4
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	227.3		117.3
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	226.6		151.6
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	226.0		146.0
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	226.3		146.3
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	212.5		137.5
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	162.0		102.0
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	192.8		172.8
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	155.7		135.7
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	227.5		157.5
42	72	76	77	0	40.0	16.136	10.411		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-10.379	-6.696	KNOWN	134.2		114.2
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	196.3		146.3
45	78	80	82	0	40.0	2.247	1.450	KNOWN	201.6		161.6
46	79	80	0	0	60.0	-6.593	-4.254	KNOWN	174.8		114.8
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	230.7		190.7
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	231.4		161.4
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	229.1		119.1
50	47	88	31	99	60.0	6.153	3.970	KNOWN	234.1		174.1
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	217.8		197.8
52	103	34	91	0	80.0	51.073	32.950		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	227.7		107.7
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	223.7		103.7
55	104	60	36	0	60.0	6.124	3.951		240.0	KNOWN	180.0
56	74	0	0	0	100.0	1.399	0.903		230.0	KNOWN	130.0
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	155.1		130.1
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	240.4		165.4
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	243.1		183.1
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	234.7		194.7
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	238.6		58.6
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	239.4		194.4
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	213.8		113.8
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	208.7		118.7
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	226.6		121.6
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	191.0		131.0
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	153.1		93.1

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.475	0.952
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.931	1.246
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	1.361	0.878
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	2.722	1.756
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	5.112	3.298
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	19.384	12.506
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.555	1.003
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	4.376	2.823
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	11.386	7.346
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.773	0.499
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	23.298	15.031
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	17.288	11.153
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.002	0.001
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.896	0.578
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.568	0.366
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	16.854	10.873
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.101	0.710
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	9.158	5.909
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	2.107	1.359
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.168	0.109
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	7.131	4.600
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	10.182	6.569
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	30.377	19.598
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	14.004	9.035
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.890	0.574
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	3.420	2.206
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.707	0.456
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.401	0.904
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	38.942	25.124
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	41.168	26.560
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.129	0.729
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	1.087	0.701
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	4.190	2.703
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	6.470	4.174
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.003	1.292
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	19.856	12.810
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	30.887	19.927
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	3.246	2.094
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	19.575	12.629
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.425	0.919
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.742	0.479
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.318	1.495
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.001	1.291
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	3.797	2.450
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	15.687	10.121
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	4.074	2.628
32	28	22	16.0	5600.0	60.0	3.3427	KNOWN	0.462	0.298
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	18.307	11.811
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	2.607	1.682
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	5.335	3.442
37	25	26	16.0	3050.0	70.0	1.3689	KNOWN	1.630	1.052
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	0.631	0.407
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	7.162	4.621
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	6.381	4.117
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	7.641	4.929
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	7.837	5.056
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.219	0.142
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	4.672	3.014
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.542	0.349
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.217	1.431
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.805	0.519
62	36	35	30.0	1800.0	70.0	0.0378	KNOWN	2.835	1.829
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	3.919	2.528
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	2.472	1.595
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	1.465	0.945
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	5.587	3.604
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	2.514	1.622
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	1.583	1.021
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	6.798	4.386
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	2.148	1.386
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	5.692	3.672
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	1.801	1.162
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	8.216	5.301
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	1.561	1.007
68	40	57	16.0	2000.0	60.0	1.1938	KNOWN	0.700	0.452
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	13.318	8.592
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	1.399	0.903
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	1.257	0.811
67	57	43	12.0	3400.0	50.0	11.5431	KNOWN	1.376	0.888
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	9.003	5.809
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.760	1.136
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	2.381	1.536
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	2.681	1.729
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	4.212	2.718
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	3.725	2.403
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.073	0.692
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.694	0.448
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.481	0.310
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	8.034	5.183
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	9.293	5.995
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	6.933	4.473
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	5.200	3.355
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.366	0.882
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	6.486	4.185
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.030	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.904	2.519
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.898	0.580
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.776	0.501
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	3.684	2.377

TABLE SHS-30
STUDY DAY: 1972 OPERATION
FIRE NEAR NODE 26
TOTAL HEAD = 135 FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	230.9		115.9
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	236.6		176.6
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	234.3		194.3
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	233.1		123.1
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	229.8		89.8
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	239.3		199.3
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	241.8		146.8
8	8	10	0	0	30.0	37.405	24.132		242.5	KNOWN	212.5
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	243.4		163.4
10	9	103	0	0	100.0	10.578	6.825		250.6	KNOWN	150.6
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	238.9		188.9
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	244.5		164.5
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	241.9		116.9
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	215.5		185.5
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	222.5		202.5
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	220.7		200.7
17	21	22	24	23	20.0	-1.590	-1.030	KNOWN	225.1		205.1
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	238.2		198.2
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	219.1		199.1
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	218.9		198.9
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	194.6		174.6
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	187.2		167.2
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	162.8		142.8
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	146.3		126.3
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	138.5		118.5
26	37	38	40	42	20.0	-0.561	-0.362		135.0	KNOWN	115.0
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	133.6		113.6
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	188.0		163.0
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	134.6		114.6
30	44	42	43	0	20.0	-23.980	-15.471	KNOWN	135.9		115.9
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	212.0		172.0
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	230.4		135.4
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	227.3		117.3
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	226.6		151.6
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	226.0		146.0
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	226.3		146.3
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	212.5		137.5
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	162.0		102.0
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	192.8		172.8
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	155.7		135.7
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	227.5		157.5
42	72	76	77	0	40.0	16.125	10.403		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-10.379	-6.696	KNOWN	134.3		114.3
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	196.3		146.3
45	78	80	82	0	40.0	2.247	1.450	KNOWN	201.6		161.6
46	79	80	0	0	60.0	-6.593	-4.254	KNOWN	174.8		114.8
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	230.7		190.7
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	231.4		161.4
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	229.1		119.1
50	47	88	31	99	60.0	6.153	3.970	KNOWN	234.1		174.1
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	217.9		197.9
52	103	34	91	0	80.0	51.050	32.935		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	227.7		107.7
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	223.7		103.7
55	104	60	36	0	60.0	6.122	3.950		240.0	KNOWN	180.0
56	74	0	0	0	100.0	1.398	0.902		230.0	KNOWN	130.0
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	155.1		130.1
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	240.4		165.4
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	243.1		183.1
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	234.7		194.7
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	238.6		58.6
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	239.4		194.4
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	213.8		113.8
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	208.7		118.7
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	226.6		121.6
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	191.0		131.0
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	153.1		93.1

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.474	0.951
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.929	1.245
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	1.357	0.876
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	2.715	1.752
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	5.104	3.293
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	19.346	12.481
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.552	1.001
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	4.364	2.816
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	11.355	7.326
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.773	0.498
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	23.285	15.022
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	17.275	11.145
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.002	0.001
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.897	0.579
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.569	0.367
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	16.820	10.852
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.099	0.709
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	9.151	5.904
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	2.106	1.359
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.167	0.108
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	7.091	4.575
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	10.179	6.567
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	30.313	19.557
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	13.998	9.031
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.891	0.575
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	3.420	2.206
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.707	0.456
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.401	0.904
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	38.919	25.109
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	41.145	26.545
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.128	0.728
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	1.081	0.697
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	4.178	2.696
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	6.442	4.156
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.010	1.297
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	19.778	12.760
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	30.822	19.885
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	3.240	2.090
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	19.544	12.609
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.424	0.919
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.737	0.475
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.317	1.495
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.003	1.293
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	3.782	2.440
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	15.624	10.080
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	4.058	2.618
32	28	22	16.0	5600.0	60.0	3.3427	KNOWN	0.462	0.298
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	18.188	11.734
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	2.575	1.661
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	5.303	3.422
37	25	26	16.0	3050.0	70.0	1.3689	KNOWN	1.647	1.063
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	0.959	0.619
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.759	0.490
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	0.610	0.393
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.721	0.465
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	7.129	4.600
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	6.349	4.096
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	7.614	4.913
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	7.849	5.064
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.220	0.142
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	4.684	3.022
57	34	35	16.0	4000.0	80.0	1.6827	KNOWN	0.542	0.350
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.216	1.430
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.805	0.519
62	36	35	30.0	1800.0	70.0	0.0378	KNOWN	2.823	1.822
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	3.919	2.528
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	2.472	1.595
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	1.465	0.945
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	5.575	3.597
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	2.514	1.622
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	1.583	1.021
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	6.798	4.386
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	2.148	1.385
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	5.692	3.672
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	1.800	1.162
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	8.215	5.300
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	1.561	1.007
68	40	57	16.0	2000.0	60.0	1.1938	KNOWN	0.700	0.451
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	13.307	8.585
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	1.398	0.902
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	1.257	0.811
67	57	43	12.0	3400.0	50.0	11.5431	KNOWN	1.376	0.888
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	9.003	5.808
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.760	1.136
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	2.381	1.536
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	2.681	1.729
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	4.212	2.718
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	3.725	2.403
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.073	0.692
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.694	0.448
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.481	0.310
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	8.034	5.183
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	9.293	5.995
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	6.933	4.473
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	5.200	3.355
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.366	0.882
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	6.485	4.184
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.904	2.519
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.898	0.579
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.776	0.501
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	3.683	2.376

TABLE SHS-31
STUDY DAY: 1972 OPERATION
FIRE NEAR NODE 51
TOTAL HEAD = 135 FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	223.7		108.7
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	228.5		168.5
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	221.9		181.9
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	229.9		119.9
5	51	53	54	0	140.0	-1.101	-0.710	KNOWN	226.7		86.7
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	233.4		193.4
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	239.5		144.5
8	8	10	0	0	30.0	75.062	48.427		242.5	KNOWN	212.5
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	241.5		161.5
10	9	103	0	0	100.0	12.464	8.041		250.6	KNOWN	150.6
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	237.4		187.4
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	242.2		162.2
13	16	20	90	15	125.0	-3.426	-2.210	KNOWN	238.9		113.9
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	203.6		173.6
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	185.2		165.2
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	179.7		159.7
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	179.7		159.7
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	227.5		187.5
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	147.7		127.7
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	147.8		127.8
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	153.8		133.8
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	149.4		129.4
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	119.1		99.1
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	107.2		87.2
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	94.7		74.7
26	37	38	40	42	20.0	-0.561	-0.362	KNOWN	88.2		68.2
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	86.6		66.6
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	160.0		135.0
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	87.6		67.6
30	44	42	43	0	20.0	-23.980	-15.471	KNOWN	88.4		68.4
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	199.0		159.0
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	227.2		132.2
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	225.1		115.1
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	224.9		149.9
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	224.5		144.5
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	225.1		145.1
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	211.1		136.1
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	161.1		101.1
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	192.2		172.2
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	154.9		134.9
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	227.0		157.0
42	72	76	77	0	40.0	17.566	11.333		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-10.379	-6.696	KNOWN	133.3		113.3
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	195.9		145.9
45	78	80	82	0	40.0	2.247	1.450	KNOWN	201.2		161.2
46	79	80	0	0	60.0	-6.593	-4.254	KNOWN	174.4		114.4
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	230.2		190.2
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	230.9		160.9
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	228.7		118.7
50	47	88	31	99	60.0	6.153	3.970	KNOWN	233.7		173.7
51	23	45	41	43	20.0	-63.899	-41.225		135.0	KNOWN	115.0
52	103	34	91	0	80.0	56.516	36.463		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	227.3		107.3
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	223.2		103.2
55	104	60	36	0	60.0	6.293	4.060		240.0	KNOWN	180.0
56	74	0	0	0	100.0	1.547	0.998		230.0	KNOWN	130.0
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	154.2		129.2
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	239.0		164.0
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	242.6		182.6
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	233.2		193.2
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	230.6		50.6
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	234.4		189.4
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	213.2		113.2
64	57	36	98	0	90.0	-1.999	-1.290	KNOWN	208.4		118.4
65	62	83	84	87	105.0	-1.659	-1.070	KNOWN	226.1		121.1
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	189.8		129.8
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	152.2		92.2

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.330	0.858
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	2.283	1.473
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	1.567	1.011
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	4.826	3.114
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	7.070	4.561
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	30.464	19.654
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.523	0.983
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	8.029	5.180
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	20.946	13.514
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.758	0.489
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	23.476	15.146
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	17.481	11.278
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.002	0.002
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.002	0.002
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.758	0.489
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.416	0.268
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	27.054	17.454
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.585	1.022
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	13.575	8.758
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	4.574	2.951
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.576	0.372
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	15.837	10.218
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	11.667	7.527
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	59.228	38.211
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	15.884	10.247
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.803	0.518
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	3.420	2.206
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.645	0.416
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.463	0.944
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	44.298	28.579
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	46.463	29.976
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.537	0.992
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	1.262	0.814
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	7.844	5.060
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	0.298	0.192
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	9.279	5.987
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	19.650	12.677
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	62.202	40.130
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	7.990	5.155
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	52.264	33.718
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	3.892	2.511
25	20	19	16.0	1000.0	70.0	0.4488	KNOWN	0.425	0.274
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	8.213	5.299
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	8.092	5.221
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.877	1.856
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	16.402	10.582
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	4.563	2.944
32	28	22	16.0	5600.0	60.0	3.3427	KNOWN	1.873	1.208
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	19.493	12.576
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	3.301	2.129
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	6.029	3.889
37	25	26	16.0	3050.0	70.0	1.3689	KNOWN	2.324	1.499
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	0.284	0.183
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	9.265	5.978
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	4.677	3.018
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	9.569	6.174
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	6.240	4.026
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.114	0.073
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	3.182	2.053
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.462	0.298
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.362	1.524
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.771	0.497
62	36	35	30.0	1800.0	70.0	0.0378	KNOWN	4.367	2.817
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	3.891	2.511
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	2.461	1.588
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	1.473	0.951
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	7.127	4.598
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	2.500	1.613
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	1.578	1.018
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	6.824	4.403
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	2.145	1.384
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	5.707	3.682
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	1.806	1.165
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	8.232	5.311
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	1.576	1.016
68	40	57	16.0	2000.0	60.0	1.1938	KNOWN	0.705	0.455
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	14.726	9.501
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	1.547	0.998
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	1.265	0.816
67	57	43	12.0	3400.0	50.0	11.5431	KNOWN	1.378	0.889
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	9.001	5.807
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.755	1.132
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	2.382	1.537
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	2.679	1.729
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	4.211	2.717
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	3.719	2.399
96	48	47	16.0	900.0	55.0	0.6318	KNOWN	1.073	0.692
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.694	0.448
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.481	0.310
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	8.028	5.179
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	9.287	5.992
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.914	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	6.928	4.469
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	5.202	3.356
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.374	0.887
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	6.636	4.282
87	65	54	20.0	10000.0	130.0	0.7707	KNOWN	2.030	1.310
36	55	64	16.0	3000.0	50.0	2.5891	KNOWN	3.929	2.535
81	59	58	12.0	800.0	45.0	3.3085	KNOWN	1.047	0.676
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.750	0.484
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	3.667	2.366

TABLE SHS-32
STUDY DAY: 1972 OPERATION
FIRE NEAR NODE 15
TOTAL HEAD = 135 FEET

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	218.0		103.0
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	221.9		161.9
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	210.9		170.9
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	227.7		117.7
5	51	53	54	0	140.0	-1.101	-0.710	KNOWN	224.6		84.6
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	228.7		188.7
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	237.5		142.5
8	8	10	0	0	30.0	91.257	58.875		242.5	KNOWN	212.5
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	240.0		160.0
10	9	103	0	0	100.0	13.879	8.954		250.6	KNOWN	150.6
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	236.2		186.2
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	240.5		160.5
13	16	20	90	15	125.0	-3.426	-2.210	KNOWN	236.6		111.6
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	194.9		164.9
15	18	20	0	0	20.0	-22.702	-14.646		135.0	KNOWN	115.0
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	144.9		124.9
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	156.0		136.0
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	221.7		181.7
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	121.1		101.1
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	121.0		101.0
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	122.2		102.2
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	119.9		99.9
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	89.4		69.4
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	83.3		63.3
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	68.5		48.5
26	37	38	40	42	20.0	-0.561	-0.362	KNOWN	60.2		40.2
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	58.6		38.6
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	141.5		116.5
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	59.6		39.6
30	44	42	43	0	20.0	-23.980	-15.471	KNOWN	60.1		40.1
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	190.2		150.2
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	225.0		130.0
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	223.6		113.6
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	223.6		148.6
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	223.3		143.3
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	224.1		144.1
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	210.1		135.1
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	160.4		100.4
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	191.7		171.7
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	154.2		134.2
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	226.6		156.6
42	72	76	77	0	40.0	18.551	11.968		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-10.379	-6.696	KNOWN	132.7		112.7
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	195.6		145.6
45	78	80	82	0	40.0	2.247	1.450	KNOWN	200.9		160.9
46	79	80	0	0	60.0	-6.593	-4.254	KNOWN	174.1		114.1
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	229.8		189.8
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	230.5		160.5
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	228.3		118.3
50	47	88	31	99	60.0	6.153	3.970	KNOWN	233.3		173.3
51	23	45	41	43	20.0	-63.899	-41.225	KNOWN	109.6		89.6
52	103	34	91	0	80.0	60.151	38.807		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	226.9		106.9
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	222.9		102.9
55	104	60	36	0	60.0	6.423	4.144		240.0	KNOWN	180.0
56	74	0	0	0	100.0	1.649	1.064		230.0	KNOWN	130.0
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	153.6		128.6
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	237.9		162.9
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	242.3		182.3
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	232.0		192.0
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	225.4		45.4
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	230.7		185.7
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	212.6		112.6
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	208.1		118.1
65	62	83	84	87	105.0	-1.659	-1.070	KNOWN	225.7		120.7
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	188.8		128.8
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	151.5		91.5

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.183	0.763
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	2.553	1.647
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	1.690	1.090
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	6.330	4.084
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	8.428	5.437
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	38.434	24.796
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.420	0.916
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	11.890	7.671
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	26.666	17.204
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.744	0.480
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	23.424	15.112
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	17.443	11.253
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.003	0.002
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.669	0.431
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.313	0.202
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	33.121	21.368
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.891	1.220
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	16.651	10.742
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	4.956	3.198
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.840	0.542
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	20.715	13.365
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	12.852	8.292
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	70.540	45.510
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	17.299	11.160
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.726	0.469
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	3.420	2.206
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.608	0.392
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.500	0.968
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	47.852	30.872
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	49.979	32.244
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.801	1.162
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	1.281	0.826
20	16	15	20.0	800.0	70.0	0.1211	KNOWN	10.812	6.975
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	10.591	6.833
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	7.946	5.127
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	18.313	11.815
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	73.900	47.677
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	8.379	5.406
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	53.333	34.409
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	4.274	2.758
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.143	0.092
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	7.772	5.014
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	7.623	4.918
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.030	1.310
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	15.911	10.265
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	4.580	2.955
32	28	22	16.0	5600.0	60.0	3.3427	KNOWN	2.736	1.765
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	19.018	12.270
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	3.622	2.337
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	6.350	4.097
37	25	26	16.0	3050.0	70.0	1.3689	KNOWN	2.646	1.707
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	26	30	16.0	4800.0	70.0	2.1543	KNOWN	0.132	0.085
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	10.450	6.742
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	4.830	3.116
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	10.735	6.926
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	5.126	3.307
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.010	0.006
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	2.170	1.400
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.393	0.253
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.471	1.594
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.743	0.479
62	36	35	30.0	1800.0	70.0	0.0378	KNOWN	5.415	3.493
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	3.868	2.496
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	2.451	1.581
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	1.481	0.956
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	8.182	5.279
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	2.489	1.606
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	1.574	1.015
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	6.845	4.416
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	2.143	1.382
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	5.719	3.690
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	1.810	1.167
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	8.246	5.320
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	1.587	1.024
68	40	57	16.0	2000.0	60.0	1.1938	KNOWN	0.709	0.458
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	15.694	10.125
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	1.649	1.064
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	1.270	0.820
67	57	43	12.0	3400.0	50.0	11.5431	KNOWN	1.379	0.890
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	9.000	5.806
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.752	1.130
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	2.383	1.537
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	2.678	1.728
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	4.211	2.716
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	3.715	2.397
96	48	47	16.0	900.0	55.0	0.6318	KNOWN	1.073	0.692
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.694	0.448
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.480	0.310
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	8.024	5.177
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	9.283	5.989
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	6.923	4.467
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	5.204	3.357
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.381	0.891
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	6.752	4.356
87	65	54	20.0	10000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5891	KNOWN	3.949	2.548
81	59	58	12.0	800.0	45.0	3.3085	KNOWN	1.161	0.749
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.728	0.470
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	3.653	2.356

TABLE SHS-33
1966 CONSUMPTIONS
UNIMPROVED NETWORK

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	233.9		118.9
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	239.1		179.1
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	237.9		197.9
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	235.8		125.8
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	232.8		92.8
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	241.0		201.0
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	242.4		147.4
8	8	10	0	0	30.0	25.264	16.299		242.5	KNOWN	212.5
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	244.0		164.0
10	9	103	0	0	100.0	10.008	6.457		250.6	KNOWN	150.6
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	240.6		190.6
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	245.6		165.6
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	243.3		118.3
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	223.1		193.1
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	232.2		212.2
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	231.4		211.4
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	232.4		212.4
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	240.0		200.0
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	228.4		208.4
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	228.4		208.4
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	223.1		203.1
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	218.0		198.0
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	215.5		195.5
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	166.1		146.1
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	157.7		137.7
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	154.1		134.1
27	38	39	0	0	20.0	-6.960	-4.490		135.0	KNOWN	115.0
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	209.1		184.1
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	148.0		128.0
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	211.1		191.1
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	221.8		181.8
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	233.5		138.5
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	230.5		120.5
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	229.8		154.8
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	229.3		149.3
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	229.3		149.3
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	225.3		150.3
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	217.1		157.1
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	221.6		201.6
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	213.9		193.9
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	229.5		159.5
42	72	76	77	0	40.0	7.145	4.610		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	216.4		196.4
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	219.1		169.1
45	78	80	82	0	40.0	2.247	1.450	KNOWN	226.4		186.4
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	216.6		156.6
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	239.2		199.2
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	239.9		169.9
49	65	86	84	0	110.0	-0.186	-0.120	KNOWN	238.2		128.2
50	47	88	31	99	60.0	6.153	3.970	KNOWN	241.9		181.9
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	227.4		207.4
52	103	34	91	0	80.0	47.147	30.417		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	236.8		116.8
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	233.6		113.6
55	104	60	36	0	60.0	4.784	3.087		240.0	KNOWN	180.0
56	74	0	0	0	100.0	0.605	0.391		230.0	KNOWN	130.0
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	214.0		189.0
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	242.2		167.2
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	246.6		186.6
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	236.5		196.5
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	240.4		60.4
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	241.1		196.1
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	223.9		123.9
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	222.3		132.3
65	62	83	84	87	105.0	-1.659	-1.070	KNOWN	236.5		131.5
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	222.1		162.1
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	217.0		157.0

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.397	0.901
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.768	1.141
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	1.116	0.722
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.900	1.226
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	4.211	2.717
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	14.894	9.609
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.361	0.878
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.960	1.910
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	7.683	4.957
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.717	0.462
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	21.470	13.851
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	15.515	10.010
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.002	0.001
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.937	0.605
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.553	0.357
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	12.193	7.867
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.918	0.592
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	8.577	5.533
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	2.009	1.296
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.108	0.069
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	2.625	1.693
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	10.018	6.463
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	22.640	14.606
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	13.427	8.663
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.662	0.427
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	3.420	2.206
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.663	0.428
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.445	0.932
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	36.304	23.422
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	38.491	24.833
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.069	0.690
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.651	0.420
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.774	1.790
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	2.918	1.882
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.562	1.653
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	10.627	6.856
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	23.052	14.872
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.572	1.659
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	15.966	10.301
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.327	0.856
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.246	0.159
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.140	1.381
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.064	1.332
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	3.074	1.983
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	7.181	4.633
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	1.187	0.766
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.701	1.098
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	6.895	4.448
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	2.665	1.719
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	5.393	3.479
37	25	26	16.0	3050.0	70.0	1.3689	KNOWN	1.688	1.089
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	3.981	2.568
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	3.180	2.052
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	5.861	3.781
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	2.979	1.922
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	5.055	3.261
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	2.655	1.713
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	5.971	3.852
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	7.693	4.963
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.221	0.143
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	4.527	2.921
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.496	0.320
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.911	1.233
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.531	0.342
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	0.466	0.301
61	35	37	16.0	2400.0	70.0	1.8771	KNOWN	2.042	1.318
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.056	0.682
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.755	0.487
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	1.776	1.146
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.944	0.609
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.567	0.366
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.426	1.565
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.379	0.890
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.517	0.334
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.773	0.499
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.680	2.374
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.698	0.450
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.327	0.211
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	5.761	3.717
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	0.605	0.391
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.684	0.441
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.421	0.272
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.399	0.903
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.091	1.349
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.747	0.482
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.289	0.832
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.446	1.578
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.290	1.477
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.054	0.680
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.612	0.395
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.379	0.245
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.700	4.322
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.939	5.122
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.599	3.612
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.679	2.374
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.281	0.826
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.237	3.379
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.872	1.853
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	1.171	0.755
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.417	0.269
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.251	0.807

TABLE SHS-34
1972 MDC HEADS
IMPROVED NETWORK
50 PSI AT NODE 27

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	257.2		142.2
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	258.5		198.5
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	258.5		218.5
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	258.5		148.5
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	257.8		117.8
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	259.5		219.5
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	260.2		165.2
8	8	10	0	0	30.0	17.748	11.450		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	261.9		181.9
10	9	103	0	0	100.0	23.312	15.040		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	261.6		211.6
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	261.5		181.5
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	260.0		135.0
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	252.5		222.5
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	256.9		236.9
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	256.2		236.2
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	256.5		236.5
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	259.1		219.1
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	255.3		235.3
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	255.3		235.3
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	254.7		234.7
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	251.6		231.6
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	252.8		232.8
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	194.4		174.4
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	177.3		157.3
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	164.1		144.1
27	38	39	0	0	20.0	-13.375	-8.629		135.0	KNOWN	115.0
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	242.2		217.2
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	154.9		134.9
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	251.8		231.8
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	251.5		211.5
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	258.2		163.2
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	258.2		148.2
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	258.0		183.0
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	258.3		178.3
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	258.7		178.7
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	256.8		181.8
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	256.2		196.2
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	257.6		237.6
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	253.7		233.7
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	259.4		189.4
42	72	76	77	0	40.0	13.149	8.483		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	255.7		235.7
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	243.9		193.9
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.6		210.6
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	241.2		181.2
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.2		222.2
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.9		192.9
49	65	86	84	0	110.0	-0.186	-0.120	KNOWN	261.3		151.3
50	47	88	31	99	60.0	6.153	3.970	KNOWN	264.9		204.9
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	255.0		235.0
52	103	34	91	0	80.0	39.899	25.741		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	259.9		139.9
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.8		136.8
55	104	60	36	0	60.0	4.451	2.871		264.0	KNOWN	204.0
56	74	0	0	0	100.0	2.812	1.814		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	254.1		229.1
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	262.0		187.0
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.4		205.4
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	261.0		221.0
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	259.1		79.1
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	259.5		214.5
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	249.0		149.0
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	247.1		157.1
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.7		154.7
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	256.4		196.4
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	255.9		195.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	1.637	1.056
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	1.781	1.149
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	1.372	0.885
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	0.457	0.295
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.009	1.941
5	6	3	36.0	1800.0	135.0	0.0045	KNOWN	18.679	12.051
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.729	1.116
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	2.823	1.821
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	9.792	6.317
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.329	0.213
50	13	4	36.0	3400.0	135.0	0.0087	KNOWN	15.826	10.210
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	10.465	6.751
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.208	0.134
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.668	0.431
58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.097	0.063
6	7	6	36.0	1760.0	135.0	0.0045	KNOWN	15.676	10.114
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.825	0.532
90	13	6	36.0	5000.0	135.0	0.0128	KNOWN	7.118	4.592
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.489	0.961
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	0.252	0.162
8	7	8	36.0	2400.0	135.0	0.0062	KNOWN	7.229	4.664
7	9	7	36.0	1920.0	135.0	0.0049	KNOWN	23.341	15.059
10	8	18	42.0	1920.0	135.0	0.0023	KNOWN	24.970	16.109
9	10	9	36.0	4700.0	135.0	0.0121	KNOWN	25.567	16.495
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	0.431	0.278
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	11	12	12.0	2600.0	135.0	1.4054	KNOWN	0.119	0.077
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	2.225	1.435
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	29.357	18.940
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	30.760	19.845
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	1.207	0.779
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	1.273	0.821
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.639	1.703
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	4.428	2.857
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	2.549	1.645
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	14.122	9.111
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	24.863	16.041
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	2.617	1.689
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	16.222	10.466
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	0.808	0.521
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.272	0.175
45	19	51	20.0	1700.0	135.0	0.0744	KNOWN	2.160	1.393
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	2.077	1.340
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.349	1.516
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	11.403	7.357
29	23	22	16.0	3050.0	135.0	0.4061	KNOWN	1.783	1.150
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	3.946	2.546
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	8.148	5.257
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	7.539	4.864
33	28	24	16.0	4800.0	135.0	0.6392	KNOWN	10.266	6.624
37	25	26	16.0	3050.0	135.0	0.4061	KNOWN	6.562	4.233
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	9.623	6.209
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	3.953	2.551
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	7.402	4.776
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	3.752	2.421
48	31	28	16.0	1600.0	135.0	0.2131	KNOWN	7.685	4.958
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	2.943	1.899
49	32	31	22.0	5120.0	135.0	0.1446	KNOWN	7.978	5.147
54	32	33	30.0	3300.0	135.0	0.0206	KNOWN	0.847	0.546
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.275	0.177
56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	2.319	1.496
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.709	0.457
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.438	0.928
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.665	0.429
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	6.412	4.137
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.206	0.778
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.519	0.335
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.499	0.322
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	8.197	5.289
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.230	0.148
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.189	0.122
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.293	2.770
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.123	0.724
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.931	1.246
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.532	0.343
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	5.650	3.645
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.358	0.231
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.569	0.367
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	11.948	7.709
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	2.811	1.814
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.842	0.543
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.919	0.593
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.895	1.223
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.996	1.288
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.791	0.510
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.269	0.819
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.402	1.550
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.151	1.388
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.052	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.604	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.369	0.238
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.571	4.239
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.809	5.038
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.471	3.529
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.455	2.229
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.195	0.771
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	6.884	4.441
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.030	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.804	1.809
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	3.042	1.963
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.465	0.300
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.336	0.217

TABLE SHS-35
1966 CONSUMPTIONS
1972 MDC HEADS
50 PSI AT NODE 51

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	245.7		130.7
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	245.8		185.8
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	242.7		202.7
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	253.4		143.4
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	253.0		113.0
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	251.4		211.4
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	257.8		162.8
8	8	10	0	0	30.0	138.899	89.612		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	260.0		180.0
10	9	103	0	0	100.0	28.227	18.211		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	259.1		209.1
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	257.3		177.3
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	254.4		129.4
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	238.8		208.8
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	216.4		196.4
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	203.0		183.0
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	197.0		177.0
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	244.7		204.7
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	154.0		134.0
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	154.5		134.5
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	201.3		181.3
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	202.0		182.0
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	197.8		177.8
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	198.8		178.8
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	195.3		175.3
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	193.5		173.5
27	38	39	0	0	20.0	-1.748	-1.128	KNOWN	192.8		172.8
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	216.0		191.0
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	193.2		173.2
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	193.5		173.5
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	237.8		197.8
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	253.3		158.3
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	253.9		143.9
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	254.4		179.4
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	255.2		175.2
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	256.5		176.5
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	254.5		179.5
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	254.7		194.7
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	256.5		236.5
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	252.2		232.2
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	258.6		188.6
42	72	76	77	0	40.0	19.878	12.824		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	254.1		234.1
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	243.5		193.5
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.2		210.2
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	240.7		180.7
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	261.8		221.8
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.5		192.5
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.0		151.0
50	47	88	31	99	60.0	6.153	3.970	KNOWN	264.5		204.5
51	23	45	41	43	20.0	-173.789	-112.122		135.0	KNOWN	115.0
52	103	34	91	0	80.0	51.702	33.356		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	259.6		139.6
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.4		136.4
55	104	60	36	0	60.0	4.708	3.037		264.0	KNOWN	204.0
56	74	0	0	0	100.0	3.218	2.076		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	252.6		227.6
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	260.1		185.1
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.1		205.1
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	258.6		218.6
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	246.3		66.3
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	252.5		207.5
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	247.9		147.9
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	246.5		156.5
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.3		154.3
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	254.4		194.4
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	254.3		194.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	0.465	0.300
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	3.275	2.113
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	1.695	1.093
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	6.154	3.970
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	7.534	4.860
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	58.538	37.767
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.382	0.892
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	12.920	8.336
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	45.597	29.417
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.242	0.156
50	13	4	36.0	3400.0	135.0	0.0087	KNOWN	12.893	8.318
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	7.415	4.784
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.002	0.002
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.504	0.325
58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.355	0.229
6	7	6	36.0	1760.0	135.0	0.0045	KNOWN	50.487	32.572
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.643	1.060
90	13	6	36.0	5000.0	135.0	0.0128	KNOWN	19.181	12.375
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	6.238	4.025
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	1.681	1.085
8	8	7	36.0	2400.0	135.0	0.0062	KNOWN	23.793	15.350
7	9	7	36.0	1920.0	135.0	0.0049	KNOWN	27.143	17.512
10	8	18	42.0	1920.0	135.0	0.0023	KNOWN	115.116	74.268
9	10	9	36.0	4700.0	135.0	0.0121	KNOWN	30.482	19.666
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	0.132	0.085
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	11	12	12.0	2600.0	135.0	1.4054	KNOWN	1.132	0.731
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	3.240	2.091
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	41.417	26.721
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	41.804	26.970
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	2.642	1.705
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	1.248	0.805
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	12.734	8.216
21	16	17	24.0	1200.0	135.0	0.0222	KNOWN	20.434	13.183
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	22.436	14.475
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	15.257	9.843
22	16	17	44.0	7000.0	135.0	0.0068	KNOWN	119.738	77.250
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	18.080	11.664
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	120.275	77.597
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	5.556	3.585
25	20	19	16.0	1000.0	135.0	0.1332	KNOWN	1.957	1.263
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	19.679	12.696
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	19.565	12.623
95	22	21	16.0	750.0	50.0	0.6273	KNOWN	1.120	0.723
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	16.005	10.326
29	22	23	16.0	3050.0	135.0	0.4061	KNOWN	3.562	2.298
32	28	22	16.0	5600.0	135.0	0.7457	KNOWN	4.868	3.141
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	18.095	11.674
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	3.198	2.063
33	28	24	16.0	4800.0	135.0	0.6392	KNOWN	5.928	3.824
37	25	26	16.0	3050.0	135.0	0.4061	KNOWN	2.229	1.438
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.300	0.839
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.650	0.419
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	0.114	0.073
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.449	0.289
48	31	28	16.0	1600.0	135.0	0.2131	KNOWN	12.161	7.846
43	30	51	16.0	3200.0	135.0	0.4261	KNOWN	14.269	9.206
49	32	31	22.0	5120.0	135.0	0.1446	KNOWN	12.479	8.051
54	33	32	30.0	3300.0	135.0	0.0206	KNOWN	6.482	4.182
55	34	33	12.0	4800.0	135.0	2.5946	KNOWN	0.394	0.254
56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	9.033	5.828
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	1.118	0.721
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.850	1.193
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.559	0.361
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	12.899	8.322
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	0.768	0.495
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.323	0.208
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.508	0.328
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	14.694	9.480
64	38	37	12.0	2700.0	50.0	9.1666	KNOWN	0.117	0.076
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.107	0.069
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.897	3.159
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.121	0.723
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	2.187	1.411
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.557	0.359
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	6.193	3.995
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.439	0.283
68	57	40	16.0	2800.0	60.0	1.1930	KNOWN	0.544	0.351
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	18.583	11.989
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	3.218	2.076
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.856	0.552
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.896	0.578
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.872	1.208
78	45	44	16.0	8000.0	100.0	1.8960	KNOWN	2.003	1.292
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.788	0.508
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.246	0.804
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.405	1.552
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.161	1.394
96	48	47	16.0	900.0	55.0	0.6318	KNOWN	1.052	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.605	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.370	0.239
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.580	4.245
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.818	5.044
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.479	3.535
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.495	2.255
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.226	0.791
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	7.643	4.931
87	65	54	20.0	16000.0	130.0	0.7787	KNOWN	2.030	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.856	1.842
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	3.760	2.426
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.390	0.252
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.058	0.037

TABLE SHS-36
1966 CONSUMPTIONS
1972 MDC HEADS
80 PSI AT NODE 51

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	252.3		137.3
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	252.8		192.8
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	251.5		211.5
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	256.5		146.5
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	256.0		116.0
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	256.0		216.0
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	259.4		164.4
8	8	10	0	0	30.0	87.760	56.619		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	261.2		181.2
10	9	103	0	0	100.0	25.174	16.241		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	260.5		210.5
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	259.7		179.7
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	257.6		132.6
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	247.8		217.8
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	239.2		219.2
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	233.0		213.0
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	231.1		211.1
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	252.9		212.9
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	212.3		192.3
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	212.5		192.5
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	231.7		211.7
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	231.7		211.7
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	229.5		209.5
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	224.8		204.8
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	223.4		203.4
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	223.1		203.1
27	38	39	0	0	20.0	-1.748	-1.128	KNOWN	222.3		202.3
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	235.9		210.9
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	222.7		202.7
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	226.9		206.9
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	247.3		207.3
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	256.3		161.3
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	256.4		146.4
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	256.4		181.4
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	256.9		176.9
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	257.7		177.7
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	255.8		180.8
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	255.6		195.6
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	257.1		237.1
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	253.1		233.1
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	259.1		189.1
42	72	76	77	0	40.0	16.433	10.602		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	255.1		235.1
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	243.8		193.8
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.4		210.4
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	241.0		181.0
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.0		222.0
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.7		192.7
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.2		151.2
50	47	88	31	99	60.0	6.153	3.970	KNOWN	264.7		204.7
51	23	45	41	43	20.0	-110.502	-71.292		204.0	KNOWN	184.0
52	103	34	91	0	80.0	45.298	29.223		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	259.8		139.8
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.7		136.7
55	104	60	36	0	60.0	4.453	2.873		264.0	KNOWN	204.0
56	74	0	0	0	100.0	2.997	1.934		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	253.5		228.5
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	261.3		186.3
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.3		205.3
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	260.0		220.0
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	253.6		73.6
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	256.5		211.5
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	248.6		148.6
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	246.8		156.8
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.5		154.5
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	255.5		195.5
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	255.3		195.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	0.904	0.584
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	2.489	1.606
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	1.348	0.870
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	3.795	2.448
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	5.614	3.622
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	41.079	26.502
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.335	0.861
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	8.573	5.531
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	30.181	19.472
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.283	0.183
50	13	4	36.0	3400.0	135.0	0.0087	KNOWN	13.649	8.806
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	8.129	5.245
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.002	0.001
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.618	0.399
58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.199	0.128
6	7	6	36.0	1760.0	135.0	0.0045	KNOWN	35.772	23.079
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.252	0.808
90	13	6	36.0	5000.0	135.0	0.0128	KNOWN	13.499	8.709
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	4.176	2.694
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	1.028	0.663
8	8	7	36.0	2400.0	135.0	0.0062	KNOWN	11.758	7.586
7	9	7	36.0	1920.0	135.0	0.0049	KNOWN	24.463	15.783
10	8	18	42.0	1920.0	135.0	0.0023	KNOWN	75.983	49.021
9	10	9	36.0	4700.0	135.0	0.0121	KNOWN	27.429	17.696
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	0.115	0.074
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	11	12	12.0	2600.0	135.0	1.4054	KNOWN	0.727	0.469
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	2.835	1.829
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	35.052	22.614
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	35.844	23.125
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	1.989	1.283
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	0.854	0.551
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	8.390	5.413
21	16	17	24.0	1200.0	135.0	0.0222	KNOWN	11.164	7.202
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	14.109	9.103
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	13.125	8.468
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	78.582	50.698
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	11.546	7.449
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	76.844	49.577
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	3.494	2.254
25	20	19	16.0	1000.0	135.0	0.1332	KNOWN	1.059	0.683
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	12.584	8.119
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	12.469	8.045
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	0.133	0.086
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	12.621	8.142
29	22	23	16.0	3050.0	135.0	0.4061	KNOWN	2.512	1.621
32	28	22	16.0	5600.0	135.0	0.7457	KNOWN	2.550	1.645
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	13.644	8.803
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	1.939	1.251
33	28	24	16.0	4800.0	135.0	0.6392	KNOWN	4.668	3.012
37	25	26	16.0	3050.0	135.0	0.4061	KNOWN	0.963	0.622
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.300	0.839
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.650	0.419
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	1.372	0.885
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.449	0.289
48	31	28	16.0	1600.0	135.0	0.2131	KNOWN	8.581	5.536
43	30	51	16.0	3200.0	135.0	0.4261	KNOWN	8.604	5.551
49	32	31	22.0	5120.0	135.0	0.1446	KNOWN	9.292	5.995
54	33	32	30.0	3300.0	135.0	0.0206	KNOWN	2.696	1.739
55	34	33	12.0	4800.0	135.0	2.5946	KNOWN	0.034	0.022
56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	5.607	3.617
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.886	0.572
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.626	1.049
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.621	0.400
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	9.643	6.221
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.049	0.677
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.443	0.286
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.506	0.326
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	11.435	7.378
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.119	0.077
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.149	0.096
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.514	2.913
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.122	0.724
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	2.039	1.315
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.541	0.349
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	5.840	3.768
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.393	0.254
68	57	40	16.0	2000.0	60.0	1.1930	KNOWN	0.560	0.361
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	15.193	9.802
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	2.997	1.934
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.848	0.547
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.910	0.587
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.886	1.217
78	45	44	16.0	8000.0	100.0	1.8960	KNOWN	1.999	1.290
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.789	0.509
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.260	0.813
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.404	1.551
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.155	1.390
96	48	47	16.0	900.0	55.0	0.6318	KNOWN	1.052	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.605	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.370	0.239
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.575	4.242
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.812	5.040
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.474	3.532
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.472	2.240
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.208	0.780
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	7.198	4.644
87	65	54	20.0	16000.0	130.0	0.7787	KNOWN	2.030	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.825	1.823
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	3.338	2.154
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.434	0.280
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.219	0.142

TABLE SHS-37
STUDY DAY: 1972
50 PSI AT NODE 51

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	226.9		111.9
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	230.8		170.8
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	225.1		185.1
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	232.9		122.9
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	230.2		90.2
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	235.1		195.1
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	240.2		145.2
8	8	10	0	0	30.0	70.022	45.176		242.5	KNOWN	212.5
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	242.2		162.2
10	9	103	0	0	100.0	11.667	7.656		250.6	KNOWN	150.6
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	239.1		189.1
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	243.3		163.3
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	240.4		115.4
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	212.7		182.7
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	193.7		173.7
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	189.0		169.0
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	185.0		165.0
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	228.8		188.8
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	149.9		129.9
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	150.1		130.1
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	181.9		161.9
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	181.1		161.1
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	172.1		152.1
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	160.9		140.9
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	158.1		138.1
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	157.7		137.7
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	156.2		136.2
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	187.8		162.8
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	157.1		137.1
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	164.5		144.5
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	211.1		171.1
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	230.7		135.7
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	228.9		118.9
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	228.7		153.7
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	228.5		148.5
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	228.6		148.6
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	224.5		149.5
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	216.5		156.5
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	221.2		201.2
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	213.4		193.4
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	229.1		159.1
42	72	76	77	0	40.0	8.914	5.751		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	215.8		195.8
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	218.8		168.8
45	78	80	82	0	40.0	2.247	1.450	KNOWN	226.1		186.1
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	216.3		156.3
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	238.8		198.8
48	96	85	83	0	70.0	-0.186	-0.120	KNOWN	239.5		169.5
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	237.9		127.9
50	47	88	31	99	60.0	6.153	3.970	KNOWN	241.6		181.6
51	23	45	41	43	20.0	-76.979	-49.664		135.0	KNOWN	115.0
52	103	34	91	0	80.0	52.701	34.001		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	236.5		116.5
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	233.3		113.3
55	104	60	36	0	60.0	4.915	3.171		240.0	KNOWN	180.0
56	74	0	0	0	100.0	0.789	0.509		230.0	KNOWN	130.0
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	213.5		188.5
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	240.8		165.8
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	246.3		186.3
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	234.9		194.9
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	232.1		52.1
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	236.0		191.0
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	223.4		123.4
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	222.0		132.0
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	236.2		131.2
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	221.4		161.4
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	216.4		156.4

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.196	0.771
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	2.148	1.386
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	1.297	0.837
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	4.454	2.874
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	6.564	4.235
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	28.189	18.186
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.235	0.797
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	7.378	4.760
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	19.240	12.413
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.686	0.443
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	21.293	13.737
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	15.370	9.916
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.002	0.001
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.791	0.510
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.377	0.243
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	24.692	15.930
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.473	0.951
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	13.393	8.640
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	4.683	3.021
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.560	0.361
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	13.734	8.861
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	11.407	7.360
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	56.288	36.315
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	15.286	9.862
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.577	0.372
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	3.420	2.206
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.606	0.391
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.502	0.969
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	41.780	26.955
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	43.905	28.326
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.521	0.981
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.704	0.454
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	7.192	4.640
21	16	17	24.0	1200.0	50.0	0.1393	KNOWN	6.148	3.966
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	10.330	6.664
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	9.768	6.302
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	59.375	38.306
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	8.402	5.421
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	55.523	35.822
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	4.001	2.581
25	20	19	16.0	1000.0	70.0	0.4488	KNOWN	0.728	0.470
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	8.945	5.771
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	8.858	5.715
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.108	0.715
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	8.289	5.347
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	2.377	1.534
32	28	22	16.0	5600.0	60.0	3.3427	KNOWN	1.455	0.939
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	9.193	5.931
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	1.466	0.946
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	4.194	2.706
37	25	26	16.0	3050.0	70.0	1.3689	KNOWN	0.489	0.316
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	1.851	1.194
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	7.013	4.524
43	30	51	16.0	3200.0	50.0	2.6763	KNOWN	3.653	2.357
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	7.875	5.080
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	5.789	3.735
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.116	0.075
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	2.728	1.760
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.351	0.227
60	55	34	16.0	3680.0	50.0	3.0776	KNOWN	2.017	1.301
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.500	0.323
62	36	35	30.0	1800.0	70.0	0.0378	KNOWN	1.640	1.058
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.018	1.302
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.043	0.673
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.756	0.488
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	3.683	2.376
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.928	0.599
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.559	0.361
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.458	1.586
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.374	0.886
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.539	0.348
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.778	0.502
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.698	2.386
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.716	0.462
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.322	0.208
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	7.506	4.843
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	0.789	0.509
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.693	0.447
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.421	0.271
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.369	0.883
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.087	1.346
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.749	0.483
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.287	0.830
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.444	1.577
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.283	1.473
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.054	0.680
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.612	0.395
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.379	0.245
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.694	4.319
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.933	5.118
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.914	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.593	3.609
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.677	2.372
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.285	0.829
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.377	3.469
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.896	1.868
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	1.313	0.847
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.390	0.252
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.230	0.794

TABLE SHS-38
STUDY DAY: 1972
27.5 MGD FLOW AT NODE 51

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	232.6		117.6
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	237.0		177.0
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	234.6		194.6
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	235.4		125.4
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	232.6		92.6
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	239.5		199.5
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	241.9		146.9
8	8	10	0	0	30.0	40.520	26.146		242.5	KNOWN	212.5
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	243.6		163.6
10	9	103	0	0	100.0	10.436	6.733		250.6	KNOWN	150.6
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	240.3		190.3
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	245.1		165.1
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	242.7		117.7
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	223.0		193.0
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	222.3		202.3
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	220.5		200.5
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	220.3		200.3
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	237.1		197.1
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	208.5		188.5
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	208.5		188.5
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	214.6		194.6
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	212.3		192.3
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	208.4		188.4
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	192.8		172.8
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	192.0		172.0
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	192.1		172.1
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	190.5		170.5
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	212.0		187.0
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	191.4		171.4
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	204.3		184.3
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	222.5		182.5
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	233.3		138.3
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	230.4		120.4
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	229.7		154.7
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	229.3		149.3
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	229.3		149.3
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	225.2		150.2
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	217.0		157.0
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	221.6		201.6
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	213.8		193.8
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	229.4		159.4
42	72	76	77	0	40.0	7.303	4.713		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	216.3		196.3
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	219.0		169.0
45	78	80	82	0	40.0	2.247	1.450	KNOWN	226.3		186.3
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	216.5		156.5
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	239.1		199.1
48	96	85	83	0	70.0	-0.186	-0.120	KNOWN	239.8		169.8
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	238.2		128.2
50	47	88	31	99	60.0	6.153	3.970	KNOWN	241.8		181.8
51	23	43	41	43	20.0	-39.902	-25.743		204.0	KNOWN	184.0
52	103	34	91	0	80.0	48.445	31.255		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	236.8		116.8
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	233.6		113.6
55	104	60	36	0	60.0	4.796	3.094		240.0	KNOWN	180.0
56	74	0	0	0	100.0	0.622	0.401		230.0	KNOWN	130.0
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	214.0		189.0
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	241.9		166.9
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	246.6		186.6
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	236.1		196.1
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	238.3		58.3
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	239.8		194.8
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	223.9		123.9
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	222.3		132.3
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	236.4		131.4
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	222.0		162.0
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	215.9		156.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.267	0.817
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.830	1.180
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	1.050	0.678
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	2.772	1.788
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	4.953	3.195
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	19.223	12.402
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.191	0.768
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	4.445	2.868
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	11.568	7.463
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.701	0.453
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	21.023	13.563
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	15.084	9.731
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.002	0.001
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.935	0.604
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.536	0.346
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	16.371	10.562
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.087	0.701
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	10.091	6.510
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	2.951	1.904
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.260	0.168
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	6.523	4.208
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	10.298	6.644
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	34.003	21.938
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	13.856	8.939
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.643	0.415
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	3.420	2.206
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.650	0.419
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.458	0.941
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	37.590	24.252
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	39.759	25.651
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.221	0.788
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.412	0.266
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	4.259	2.748
21	16	17	24.0	1200.0	50.0	0.1393	KNOWN	1.271	0.820
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	5.496	3.546
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	8.875	5.726
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	35.358	22.812
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	4.681	3.020
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	30.351	19.581
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	2.269	1.464
25	20	19	16.0	1000.0	70.0	0.4488	KNOWN	0.167	0.108
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	4.662	3.008
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	4.585	2.958
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.006	1.294
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	6.497	4.192
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	1.524	0.983
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.296	0.191
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	6.548	4.225
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.761	0.491
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.489	2.251
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.215	0.139
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.556	1.649
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	4.557	2.940
43	30	51	16.0	3200.0	50.0	2.6763	KNOWN	0.304	0.196
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	5.711	3.684
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	7.524	4.854
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.212	0.137
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	4.362	2.814
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	0.480	0.310
60	55	34	16.0	3680.0	50.0	3.0776	KNOWN	1.920	1.239
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.529	0.341
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	0.201	0.130
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.041	1.317
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.056	0.681
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.755	0.487
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	1.948	1.257
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.943	0.608
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.566	0.365
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.428	1.567
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.378	0.889
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.520	0.335
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.774	0.499
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.681	2.375
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.699	0.451
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.327	0.211
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	5.922	3.820
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	0.622	0.401
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.685	0.442
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.421	0.272
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.398	0.902
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.090	1.348
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.748	0.482
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.290	0.832
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.445	1.578
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.288	1.476
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.054	0.680
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.612	0.395
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.379	0.245
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.698	4.321
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.937	5.121
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.597	3.611
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.676	2.372
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.280	0.826
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.267	3.398
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.875	1.855
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	1.203	0.776
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.414	0.267
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.250	0.806

TABLE SHS-39
2020 CONSUMPTIONS
1966 HEADS
IMPROVED NETWORK

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-3.682	-2.376	KNOWN	227.0		112.0
2	1	3	4	0	60.0	-1.640	-1.058	KNOWN	231.4		171.4
3	3	5	2	13	40.0	-8.603	-5.550	KNOWN	231.1		191.1
4	51	50	52	104	110.0	-12.053	-7.776	KNOWN	227.3		117.3
5	51	53	54	0	140.0	-2.553	-1.647	KNOWN	223.0		83.0
6	4	5	0	11	40.0	-1.222	-0.789	KNOWN	235.5		195.5
7	6	8	7	0	95.0	-0.866	-0.559	KNOWN	240.9		145.9
8	8	10	0	0	30.0	92.981	59.988		242.5	KNOWN	212.5
9	11	7	9	12	80.0	-3.435	-2.216	KNOWN	243.0		163.0
10	9	103	0	0	100.0	22.309	14.393		250.6	KNOWN	150.6
11	14	93	13	0	50.0	-2.151	-1.388	KNOWN	240.3		190.3
12	14	15	34	0	90.0	-2.878	-1.857	KNOWN	249.6		159.6
13	16	53	93	15	125.0	-6.173	-3.983	KNOWN	235.5		110.5
14	17	2	46	0	30.0	-3.280	-2.116	KNOWN	216.7		186.7
15	18	20	0	0	20.0	-0.309	-0.200	KNOWN	222.9		202.9
16	19	20	21	26	20.0	-0.309	-0.200	KNOWN	218.9		198.9
17	21	22	24	23	20.0	-2.723	-1.757	KNOWN	219.0		199.0
18	10	22	92	0	40.0	-1.640	-1.058	KNOWN	236.0		196.0
19	24	25	45	0	20.0	-0.309	-0.200	KNOWN	208.1		188.1
20	26	25	41	0	20.0	-1.259	-0.812	KNOWN	205.1		185.1
21	27	95	23	0	20.0	-0.619	-0.399	KNOWN	215.6		195.6
22	95	29	32	0	20.0	-0.309	-0.200	KNOWN	211.0		191.0
23	28	29	44	0	20.0	-2.537	-1.637	KNOWN	211.2		191.2
24	35	33	0	0	20.0	-6.282	-4.053	KNOWN	167.6		147.6
25	35	37	0	0	20.0	-2.243	-1.447	KNOWN	165.4		145.4
26	37	38	40	42	20.0	-0.820	-0.529	KNOWN	165.3		145.3
27	38	39	0	0	20.0	-4.054	-2.615	KNOWN	161.9		141.9
28	32	33	48	0	25.0	-3.156	-2.036	KNOWN	203.6		178.6
29	40	39	0	0	20.0	-0.449	-0.289	KNOWN	163.0		143.0
30	44	42	43	0	20.0	-6.375	-4.113	KNOWN	208.3		188.3
31	46	48	43	0	40.0	-3.605	-2.326	KNOWN	214.9		174.9
32	52	53	49	54	95.0	-2.120	-1.368	KNOWN	226.0		131.0
33	54	55	56	0	110.0	-6.808	-4.392	KNOWN	224.2		114.2
34	58	35	57	60	75.0	-4.936	-3.184	KNOWN	220.9		145.9
35	56	57	62	61	80.0	-4.936	-3.184	KNOWN	223.9		143.9
36	62	63	75	0	80.0	-3.853	-2.486	KNOWN	224.6		144.6
37	61	63	64	66	75.0	-3.853	-2.486	KNOWN	211.5		136.5
38	64	70	69	65	60.0	-4.394	-2.835	KNOWN	205.3		145.3
39	70	71	73	72	20.0	-3.497	-2.256	KNOWN	214.3		194.3
40	71	68	0	0	20.0	-3.296	-2.126	KNOWN	186.4		166.4
41	75	73	76	74	70.0	-2.739	-1.767	KNOWN	226.7		156.7
42	72	76	77	0	40.0	32.656	21.068		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-2.243	-1.447	KNOWN	202.3		182.3
44	77	78	79	97	50.0	-6.607	-4.262	KNOWN	161.6		111.6
45	78	80	82	0	40.0	6.127	3.953	KNOWN	192.5		152.5
46	79	80	0	0	60.0	-7.380	-4.761	KNOWN	148.1		88.1
47	96	47	83	0	40.0	-2.677	-1.727	KNOWN	233.0		193.0
48	96	85	84	0	70.0	-0.356	-0.230	KNOWN	235.7		165.7
49	85	86	84	0	110.0	-0.387	-0.250	KNOWN	228.1		118.1
50	47	88	31	99	60.0	13.322	8.595	KNOWN	245.2		185.2
51	23	45	41	43	20.0	-76.337	-49.249		204.0	KNOWN	184.0
52	103	34	91	0	80.0	75.686	48.830		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-2.692	-1.737	KNOWN	217.8		97.8
54	87	0	0	0	120.0	-5.926	-3.823	KNOWN	199.7		79.7
55	104	60	35	0	60.0	8.752	5.646		240.0	KNOWN	180.0
56	74	0	0	0	100.0	3.135	2.022		230.0	KNOWN	130.0
57	69	68	67	0	25.0	-4.394	-2.835	KNOWN	189.8		164.8
58	12	93	81	0	75.0	-0.727	-0.469	KNOWN	242.2		167.2
59	31	91	81	0	60.0	-0.727	-0.469	KNOWN	248.3		188.3
60	13	0	0	0	40.0	-1.810	-1.168	KNOWN	238.6		198.6
61	30	92	0	0	180.0	-1.222	-0.789	KNOWN	235.7		55.7
62	89	94	0	0	45.0	-1.810	-1.168	KNOWN	235.2		190.2
63	59	99	98	0	100.0	-3.574	-2.306	KNOWN	174.0		74.0
64	97	36	98	0	90.0	-4.765	-3.074	KNOWN	169.2		79.2
65	82	83	84	87	105.0	-3.419	-2.206	KNOWN	220.5		115.5
66	100	66	101	0	60.0	-0.851	-0.549	KNOWN	208.8		148.8
67	65	102	101	0	60.0	-1.083	-0.699	KNOWN	203.8		143.8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTANCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	2.824	1.822
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	3.053	1.969
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	2.194	1.415
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	1.861	1.201
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	6.326	4.082
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	40.479	26.115
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	2.786	1.798
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	6.888	4.444
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	24.054	15.519
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.933	0.602
50	13	4	36.0	3400.0	135.0	0.0087	KNOWN	39.048	25.192
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	26.064	16.816
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.003	0.002
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	2.069	1.335
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.450	0.290
6	7	6	36.0	1760.0	135.0	0.0045	KNOWN	45.843	29.576
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.519	0.980
90	13	6	36.0	5000.0	135.0	0.0128	KNOWN	0.622	0.402
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	1.116	0.720
89	6	62	16.0	3200.0	135.0	0.4261	KNOWN	0.832	0.537
8	8	7	36.0	2400.0	135.0	0.0042	KNOWN	20.372	13.143
7	9	7	36.0	1920.0	135.0	0.0049	KNOWN	26.342	16.995
10	8	18	42.0	1920.0	135.0	0.0023	KNOWN	72.607	46.843
9	10	9	36.0	4700.0	135.0	0.0121	KNOWN	32.556	21.004
12	9	58	16.0	3700.0	135.0	0.4927	KNOWN	1.261	0.813
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	10.247	6.611
14	11	12	12.0	2600.0	135.0	1.4054	KNOWN	0.731	0.471
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	4.691	3.026
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	1.810	1.168
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	49.614	32.009
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	51.761	33.394
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	0.981	0.633
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	1.700	1.097
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	6.578	4.244
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	1.446	0.933
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	9.990	6.445
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	21.777	14.049
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	68.626	44.275
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	8.611	5.556
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	55.848	36.031
92	18	61	20.0	1440.0	135.0	0.0647	KNOWN	2.341	1.510
25	20	19	16.0	1000.0	135.0	0.1332	KNOWN	0.282	0.182
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	8.584	5.538
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	8.439	5.445
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.964	1.912
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	18.194	11.738
29	23	22	16.0	3050.0	135.0	0.4061	KNOWN	0.784	0.506
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	3.439	2.218
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	14.872	9.595
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	2.534	1.635
33	28	24	16.0	4800.0	135.0	0.6392	KNOWN	8.816	5.687
37	25	26	16.0	3050.0	135.0	0.4061	KNOWN	0.290	0.187
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	3.009	1.941
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	1.494	0.964
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	5.032	3.247
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	1.045	0.674
48	31	28	16.0	1600.0	135.0	0.2131	KNOWN	8.534	5.506
43	30	51	16.0	3200.0	135.0	0.4261	KNOWN	3.465	2.236
49	32	31	22.0	5120.0	135.0	0.1446	KNOWN	10.438	6.734
54	32	33	30.0	3300.0	135.0	0.0206	KNOWN	11.442	7.382
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	1.126	0.727
56	33	35	30.0	3400.0	135.0	0.0212	KNOWN	3.501	2.259
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	2.312	1.492
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.678	1.728
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	1.630	1.051
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	9.075	5.855
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	3.751	2.420
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.574	1.015
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	1.428	0.921
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	14.351	9.259
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.811	0.523
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.515	0.333
70	39	38	24.0	2040.0	135.0	0.0934	KNOWN	11.818	7.624
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	3.326	2.146
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	4.908	3.167
71	39	40	12.0	3600.0	50.0	12.4937	KNOWN	1.543	0.996
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	15.878	10.244
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.980	0.632
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	1.752	1.130
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	29.833	19.247
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	3.135	2.022
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	1.842	1.188
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	2.820	1.819
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	5.064	3.267
78	45	44	16.0	8000.0	100.0	1.8960	KNOWN	4.563	2.944
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	1.850	1.194
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	2.052	1.324
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	5.530	3.568
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	3.966	2.558
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	2.191	1.414
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	1.363	0.880
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.878	0.566
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	15.512	10.008
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	18.059	11.651
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	2.692	1.737
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	12.433	8.021
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	8.792	5.672
99	50	63	12.0	8000.0	80.0	11.3045	KNOWN	2.691	1.736
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	13.677	8.824
87	65	54	20.0	10000.0	130.0	0.7707	KNOWN	5.926	3.823
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	6.071	3.917
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	4.158	2.683
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.747	0.482
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.238	0.799

TABLE SHS-40
STUDY DAY: 1972
UNIMPROVED NETWORK

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	251.3		136.3
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	256.0		196.0
3	3	5	2	13	40.0	-4.789	-3.090	KNOWN	255.6		215.6
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	255.6		145.6
5	51	53	54	0	140.0	-1.101	-0.710	KNOWN	254.4		114.4
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	257.2		217.2
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	259.4		164.4
8	8	10	0	0	30.0	20.904	13.486		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	260.7		180.7
10	9	103	0	0	100.0	12.088	7.798		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	256.4		206.4
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	261.1		181.1
13	16	58	93	15	125.0	-3.426	-2.210	KNOWN	259.5		134.5
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	243.6		213.6
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	240.2		220.2
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	237.9		217.9
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	233.5		213.5
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	259.0		219.0
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	231.1		211.1
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	231.3		211.3
21	27	95	23	0	20.0	-0.372	-0.240	KNOWN	233.7		213.7
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	232.3		212.3
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	229.3		209.3
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	214.0		194.0
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	213.4		193.4
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	213.5		193.5
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	211.9		191.9
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	232.2		207.2
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	212.9		192.9
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	226.6		206.6
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	243.2		203.2
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	254.6		159.6
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	254.6		144.6
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	254.4		179.4
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	254.7		174.7
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	255.7		175.7
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	251.3		176.3
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	244.5		184.5
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	249.8		229.8
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	241.4		221.4
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	258.2		188.2
42	72	76	77	0	40.0	12.846	8.289		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	243.8		223.8
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	240.3		190.3
45	78	80	82	0	40.0	2.247	1.450	KNOWN	246.0		206.0
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	237.0		177.0
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	255.5		215.5
48	96	85	84	0	70.0	-0.186	-0.120	KNOWN	256.2		186.2
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	254.7		144.7
50	47	88	31	99	60.0	6.153	3.970	KNOWN	258.1		198.1
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	229.8		209.8
52	103	34	91	0	80.0	37.219	24.012		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	253.4		133.4
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	250.3		130.3
55	104	60	36	0	60.0	4.912	3.169		264.0	KNOWN	204.0
56	74	0	0	0	100.0	1.776	1.146		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	241.6		216.6
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	258.0		183.0
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	261.5		201.5
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	252.2		212.2
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	257.7		77.7
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	257.2		212.2
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	245.2		145.2
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	244.1		154.1
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	253.2		148.2
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	248.5		188.5
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	244.3		184.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTANCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.329	0.857
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.649	1.064
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.932	0.601
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.016	0.656
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.260	2.103
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	23.136	14.927
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.218	0.786
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	5.035	3.248
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	13.110	8.458
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.450	0.291
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	15.007	9.682
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	9.323	6.015
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.002	0.001
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.665	0.429
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.014	0.009
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	15.573	10.047
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.007	0.650
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	8.645	5.578
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	1.737	1.121
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.115	0.074
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	6.847	4.417
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	9.176	5.920
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	14.057	9.069
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	12.839	8.283
12	9	58	16.0	3700.0	45.0	5.7005	KNOWN	0.827	0.534
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	0.753	0.486
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.643	0.415
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.465	0.945
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	29.804	19.229
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	31.965	20.622
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.076	0.694
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.321	0.207
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	4.849	3.128
21	16	17	24.0	1200.0	50.0	0.1393	KNOWN	6.460	4.168
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	3.961	2.555
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	7.352	4.743
22	18	17	20.0	7000.0	135.0	0.3144	KNOWN	10.723	6.918
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	1.963	1.267
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	13.623	8.789
92	18	61	20.0	1440.0	65.0	0.2500	KNOWN	2.419	1.561
25	20	19	16.0	1000.0	70.0	0.4488	KNOWN	0.648	0.418
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.426	1.565
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.569	1.657
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.577	1.017
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.403	3.486
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	1.306	0.842
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.085	0.055
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	5.237	3.378
35	24	25	16.0	3050.0	70.0	1.3089	KNOWN	0.667	0.431
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.395	2.191
37	26	25	16.0	3050.0	70.0	1.3089	KNOWN	0.309	0.199
38	26	27	16.0	3300.0	70.0	1.4011	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.650	1.709
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	75.0	0.6328	KNOWN	4.674	3.016
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.102	0.711
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	5.919	3.819
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	1.824	1.177
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.100	0.064
56	35	33	30.0	3400.0	70.0	0.0715	KNOWN	1.229	0.793
57	35	34	16.0	4800.0	80.0	1.6827	KNOWN	0.371	0.239
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.848	1.192
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.675	0.435
62	36	35	30.0	1800.0	70.0	0.0378	KNOWN	6.079	3.922
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.861	1.200
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.968	0.624
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.798	0.515
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	8.163	5.267
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.849	0.548
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.523	0.337
70	39	38	24.0	2040.0	40.0	0.8867	KNOWN	2.622	1.692
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.356	0.875
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.638	0.412
71	39	40	12.0	3600.0	50.0	12.4937	KNOWN	0.804	0.519
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.827	2.469
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.777	0.502
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.293	0.189
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	11.130	7.181
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	1.776	1.146
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.941	0.607
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.412	0.266
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.343	0.867
78	45	44	16.0	8000.0	100.0	1.8960	KNOWN	1.828	1.179
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.862	0.556
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.410	0.910
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.331	1.504
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.911	1.233
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.048	0.676
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.591	0.381
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.352	0.227
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.348	4.096
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.582	4.892
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.914	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.248	3.386
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.088	1.992
99	50	63	12.0	8000.0	80.0	11.3045	KNOWN	1.068	0.689
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	4.501	2.904
87	65	54	20.0	10000.0	130.0	0.7707	KNOWN	2.030	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.062	1.975
81	59	58	12.0	800.0	45.0	3.3085	KNOWN	1.026	0.662
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.348	0.225
101	66	67	12.0	1430.0	60.0	3.3922	KNOWN	1.110	0.721

TABLE SHS-41
STUDY DAY: 1972
UNIMPROVED NETWORK
PIPES 10 & 23 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	247.5		132.5
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	251.6		191.6
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	251.0		211.0
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	254.0		144.0
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	252.9		112.9
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	253.0		213.0
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	257.7		162.7
8	8	10	0	0	30.0	13.756	8.875		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	259.3		179.3
10	9	103	0	0	100.0	13.563	8.751		268.8	KNOWN	168.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	255.4		205.4
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	259.7		179.7
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	257.7		132.7
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	238.1		208.1
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	230.1		210.1
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	227.1		207.1
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	226.2		206.2
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	235.6		195.6
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	199.5		179.5
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	199.6		179.6
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	219.9		199.9
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	218.4		198.4
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	211.1		191.1
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	197.1		177.1
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	195.4		175.4
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	195.3		175.3
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	193.8		173.8
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	220.2		195.2
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	194.7		174.7
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	204.5		184.5
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	237.3		197.3
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	253.1		158.1
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	253.1		143.1
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	253.1		178.1
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	253.4		173.4
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	254.8		174.8
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	250.2		175.2
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	243.7		183.7
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	249.3		229.3
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	240.5		220.5
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	257.9		187.9
42	72	76	77	0	40.0	13.873	8.950		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	243.0		223.0
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	240.0		190.0
45	78	80	82	0	40.0	2.247	1.450	KNOWN	245.7		205.7
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	236.7		176.7
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	255.2		215.2
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	255.9		185.9
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	254.5		144.5
50	47	88	31	99	60.0	6.153	3.970	KNOWN	257.8		197.8
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	188.7		168.7
52	103	34	91	0	80.0	41.364	26.687		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	253.1		133.1
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	250.1		130.1
55	104	60	36	0	60.0	5.355	3.455		264.0	KNOWN	204.0
56	74	0	0	0	100.0	1.850	1.194		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	240.8		215.8
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	257.1		182.1
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	261.3		201.3
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	251.2		211.2
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	245.2		65.2
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	253.7		208.7
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	244.8		144.8
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	243.8		153.8
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	252.9		147.9
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	247.5		187.5
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	243.6		183.6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.240	0.800
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.846	1.191
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	1.040	0.671
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.325	0.855
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.479	2.245
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	26.086	16.830
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.268	0.818
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	5.922	3.821
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	15.432	9.956
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.424	0.273
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	14.576	9.404
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	9.201	5.936
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.289	0.186
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.547	0.353
58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.129	0.084
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	23.639	15.251
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.390	0.897
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	12.572	8.111
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	7.841	5.059
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.488	0.315
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	13.745	8.867
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	10.343	6.673
10	8	18	42.0	1920.0	0.0	99.9999	KNOWN	0.011	0.007
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	14.316	9.236
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	0.754	0.486
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	0.753	0.486
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.610	0.394
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.498	0.966
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	33.869	21.851
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	35.998	23.225
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.449	0.935
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.479	0.309
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	5.736	3.701
21	16	17	24.0	1200.0	50.0	0.1393	KNOWN	2.608	1.682
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	8.570	5.529
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	9.804	6.325
22	18	17	20.0	7000.0	135.0	0.3144	KNOWN	6.256	4.036
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	7.260	4.684
23	17	51	42.0	7200.0	0.0	99.9999	KNOWN	0.007	0.004
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	7.159	4.619
25	20	19	16.0	1000.0	70.0	0.4488	KNOWN	0.428	0.276
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	7.502	4.840
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	7.398	4.773
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.598	1.031
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	7.834	5.054
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	2.123	1.370
32	28	22	16.0	5600.0	60.0	3.3427	KNOWN	0.710	0.458
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	8.484	5.474
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	1.130	0.729
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.858	2.489
37	25	26	16.0	3050.0	70.0	1.3689	KNOWN	0.153	0.099
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.187	1.411
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	5.932	3.827
43	30	51	16.0	3200.0	50.0	2.6763	KNOWN	2.608	1.683
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	7.019	4.528
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	0.721	0.465
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.027	0.017
56	35	33	30.0	3400.0	70.0	0.0715	KNOWN	2.251	1.452
57	35	34	16.0	4800.0	80.0	1.6827	KNOWN	0.418	0.270
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.982	1.278
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.639	0.412
62	36	35	30.0	1800.0	70.0	0.0378	KNOWN	7.079	4.567
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.811	1.168
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.945	0.610
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.815	0.526
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	9.180	5.923
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.826	0.533
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.512	0.331
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.685	1.732
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.360	0.878
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.672	0.433
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.825	0.532
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.876	2.500
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.798	0.515
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.440	0.284
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	12.121	7.820
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	1.850	1.194
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.948	0.611
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.408	0.264
102	67	43	20.0	1600.0	80.0	0.3222	KNOWN	1.385	0.894
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.827	1.179
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.863	0.557
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.405	0.907
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.330	1.503
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.910	1.232
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.048	0.676
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.591	0.381
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.352	0.227
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.347	4.095
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.581	4.891
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.247	3.385
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.094	1.996
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.076	0.694
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	4.613	2.976
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.085	1.990
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	1.132	0.730
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.320	0.206
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.085	0.700

TABLE SHS-42
1972 MDC HEADS; 1966 CONSUMPTIONS
MAJOR PIPES REHABILITATED
MDC VENTURI 94 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	256.7		141.7
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	257.9		197.9
3	3	5	2	8	40.0	-4.789	-3.090	KNOWN	257.9		217.9
4	51	50	52	1 4	110.0	-5.239	-3.380	KNOWN	257.8		147.8
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	257.3		117.3
6	4	5	6	1	40.0	-0.682	-0.440	KNOWN	258.6		218.6
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	260.0		165.0
8	8	10	0	0	30.0	25.695	16.578		260.0	KNOWN	230.0
9	11	7	9	2	80.0	-1.829	-1.180	KNOWN	261.5		181.5
10	9	103	0	0	100.0	42.419	27.367		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	258.7		208.7
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	258.7		178.7
13	16	50	90	5	125.0	-3.426	-2.210	KNOWN	258.4		133.4
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	254.3		224.3
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	257.1		237.1
16	19	20	21	6	20.0	-0.186	-0.120	KNOWN	256.7		236.7
17	21	22	24	3	20.0	-1.596	-1.030	KNOWN	256.9		236.9
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	259.1		219.1
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	255.9		235.9
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	255.9		235.9
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	256.0		236.0
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	254.8		234.8
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	255.1		235.1
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	248.0		228.0
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	248.1		228.1
26	37	38	40	2	20.0	-0.387	-0.250	KNOWN	248.5		228.5
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	247.8		227.8
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	252.0		227.0
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	248.2		228.2
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	254.6		234.6
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	254.2		214.2
32	52	53	49	4	95.0	-0.914	-0.590	KNOWN	257.7		162.7
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	257.7		147.7
34	58	55	57	6	75.0	-1.659	-1.070	KNOWN	257.5		182.5
35	56	57	62	1	80.0	-1.659	-1.070	KNOWN	257.9		177.9
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	258.4		178.4
37	61	63	64	6	75.0	-1.286	-0.830	KNOWN	256.5		181.5
38	64	70	69	5	60.0	-1.472	-0.950	KNOWN	256.0		196.0
39	70	71	73	2	20.0	-1.178	-0.760	KNOWN	257.4		237.4
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	253.5		233.5
41	75	73	76	4	70.0	-0.914	-0.590	KNOWN	259.3		189.3
42	72	76	77	0	40.0	14.256	9.197		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	255.5		235.5
44	77	78	79	7	50.0	-3.317	-2.140	KNOWN	240.8		190.8
45	78	80	82	0	40.0	2.247	1.450	KNOWN	246.5		206.5
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	237.6		177.6
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	256.1		216.1
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	256.8		186.8
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	255.3		145.3
50	47	88	31	9	60.0	6.153	3.970	KNOWN	258.7		198.7
51	23	45	41	3	20.0	- 7.515	-11.300	KNOWN	255.6		235.6
52	103	34	91	0	80.0	0.000	0.000	KNOWN	259.6		179.6
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	253.9		133.9
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	250.9		130.9
55	104	60	36	0	60.0	4.510	2.910		264.0	KNOWN	204.0
56	74	0	0	0	100.0	2.366	1.849		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	254.0		229.0
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	259.1		184.1
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	259.1		199.1
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	258.1		218.1
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	258.9		78.9
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	258.4		213.4
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	246.2		146.2
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	244.7		154.7
65	82	83	84	7	105.0	-1.659	-1.070	KNOWN	253.8		148.8
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	256.1		196.1
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	255.7		195.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	1.606	1.036
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	1.381	0.891
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	0.941	0.607
3	3	2	16.0	800.0	135.0	0.1065	KNOWN	0.042	0.027
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.479	1.600
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	15.189	9.799
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.316	0.849
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	2.036	1.314
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	7.001	4.517
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.271	0.175
50	13	4	36.0	3400.0	135.0	0.0087	KNOWN	10.125	6.532
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	4.617	2.979
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.002	0.001
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.703	0.453
58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.127	0.082
6	7	6	36.0	1760.0	135.0	0.0045	KNOWN	21.710	14.006
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.897	0.579
90	6	13	36.0	5000.0	135.0	0.0128	KNOWN	4.677	3.017
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	1.164	0.751
89	6	62	16.0	3200.0	135.0	0.4261	KNOWN	0.739	0.477
8	8	7	36.0	2400.0	135.0	0.0062	KNOWN	0.409	0.264
7	9	7	36.0	1920.0	135.0	0.0049	KNOWN	21.733	14.021
10	8	18	42.0	1920.0	135.0	0.0023	KNOWN	25.288	16.315
9	10	9	36.0	4700.0	135.0	0.0121	KNOWN	26.814	17.299
12	9	58	16.0	3700.0	135.0	0.4927	KNOWN	2.340	1.509
103	10	52	24.0	2400.0	135.0	0.0444	KNOWN	15.610	10.071
14	11	12	12.0	2600.0	135.0	1.4054	KNOWN	0.034	0.022
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	2.145	1.384
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	10.475	6.758
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	11.955	7.713
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	0.225	0.145
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	0.427	0.275
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	1.850	1.194
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	3.411	2.201
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	2.505	1.616
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	9.572	6.175
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	22.528	14.534
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	2.427	1.566
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	15.092	9.737
92	18	61	20.0	1440.0	135.0	0.0647	KNOWN	1.847	1.192
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.208	0.134
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	2.034	1.312
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	1.968	1.270
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.418	0.915
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	7.781	5.020
29	23	22	16.0	3050.0	135.0	0.4061	KNOWN	0.816	0.527
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	2.049	1.322
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	5.492	3.543
35	25	24	16.0	3050.0	135.0	0.4061	KNOWN	0.065	0.042
33	28	24	16.0	4800.0	135.0	0.6392	KNOWN	2.663	1.718
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	1.042	0.672
38	26	27	16.0	3300.0	135.0	0.4594	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	135.0	0.6392	KNOWN	3.382	2.182
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	1.978	1.276
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	1.579	1.019
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.116	2.010
54	33	32	30.0	3300.0	135.0	0.0206	KNOWN	0.121	0.078
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.259	0.167
56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	3.319	2.141
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.785	0.506
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.496	0.965
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.754	0.487
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	7.427	4.791
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.165	0.752
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.499	0.322
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.501	0.323
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	9.215	5.945
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.202	0.130
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.179	0.115
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.352	2.807
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.119	0.722
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.964	1.267
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.533	0.344
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	5.698	3.676
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.368	0.238
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.566	0.365
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	12.960	8.361
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	2.866	1.849
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.927	0.598
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.920	0.593
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.787	1.153
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.830	1.181
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.861	0.556
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.421	0.917
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.331	1.504
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.914	1.235
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.048	0.676
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.591	0.381
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.352	0.227
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.351	4.098
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.585	4.894
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.251	3.388
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.072	1.982
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.049	0.677
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	3.651	2.355
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.030	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.012	1.943
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	0.199	0.128
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.409	0.264
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.303	0.196

TABLE SHS-43
1972 MDC HEADS
MAJOR PIPES REHABILITATED
(EXCEPT PIPE 10)

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	257.3		142.3
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	257.9		197.9
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	257.9		217.9
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	258.4		148.4
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	257.8		117.8
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	258.7		218.7
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	260.0		165.0
8	8	10	0	0	30.0	21.905	14.132		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	261.6		181.6
10	9	103	0	0	100.0	9.557	6.166		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	261.8		211.8
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	262.1		182.1
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	260.8		135.8
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	254.5		224.5
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	256.7		236.7
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	256.2		236.2
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	256.2		236.2
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	258.0		218.0
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	255.2		235.2
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	255.2		235.2
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	255.5		235.5
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	254.3		234.3
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	254.6		234.6
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	236.9		216.9
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	236.9		216.9
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	237.1		217.1
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	236.4		216.4
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	251.4		226.4
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	236.8		216.8
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	254.1		234.1
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	254.3		214.3
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	258.3		163.3
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	258.2		148.2
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	258.0		183.0
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	258.3		178.3
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	258.7		178.7
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	256.8		181.8
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	256.2		196.2
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	257.6		237.6
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	253.7		233.7
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	259.4		189.4
42	72	76	77	0	40.0	13.062	8.427		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	255.7		235.7
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	243.9		193.9
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.6		210.6
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	241.2		181.2
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.2		222.2
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.9		192.9
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.3		151.3
50	47	88	31	99	60.0	6.153	3.970	KNOWN	264.9		204.9
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	254.9		234.9
52	103	34	91	0	80.0	38.174	24.629		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	259.9		139.9
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.8		136.8
55	104	60	36	0	60.0	4.240	2.736		264.0	KNOWN	204.0
56	74	0	0	0	100.0	2.807	1.811		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	254.1		229.1
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	262.0		187.0
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.4		205.4
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	261.2		221.2
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	258.1		78.1
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	259.4		214.4
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	249.0		149.0
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	247.1		157.1
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.7		154.7
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	256.4		196.4
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	255.9		195.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	1.113	0.718
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	1.983	1.279
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	1.050	0.677
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	0.580	0.374
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.608	1.682
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	16.402	10.582
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.287	0.830
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	2.447	1.579
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	8.458	5.457
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.285	0.184
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	11.486	7.410
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	5.964	3.848
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.002	0.001
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.708	0.457
58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.107	0.069
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.574	7.467
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.899	0.580
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	7.979	5.148
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	2.007	1.295
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	1.246	0.804
8	8	7	36.0	2400.0	135.0	0.0062	KNOWN	1.957	1.263
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	10.066	6.494
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	19.948	12.870
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	11.812	7.621
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	0.983	0.634
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	12	11	12.0	2600.0	135.0	1.4054	KNOWN	0.443	0.286
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	1.665	1.074
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	27.080	17.471
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	29.043	18.737
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	2.207	1.424
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	0.507	0.327
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.261	1.459
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	1.579	1.019
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	2.670	1.722
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	9.443	6.092
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	20.359	13.135
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	2.359	1.522
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	14.824	9.564
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	1.325	0.855
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.101	0.065
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	2.072	1.337
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	2.027	1.308
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.415	0.913
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	7.656	4.939
29	23	22	16.0	3050.0	135.0	0.4061	KNOWN	0.850	0.549
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	2.079	1.341
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	5.333	3.441
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	0.265	0.171
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.993	1.931
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	0.711	0.459
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	3.052	1.969
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.278	1.470
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	1.408	0.908
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.336	2.152
54	32	33	30.0	3300.0	135.0	0.0206	KNOWN	1.005	0.649
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.283	0.182
56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	2.218	1.431
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.714	0.461
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.435	0.926
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.666	0.429
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	6.328	4.083
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.210	0.781
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.521	0.336
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.499	0.322
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	8.109	5.232
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.232	0.150
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.190	0.123
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.291	2.768
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.120	0.723
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.941	1.252
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.531	0.343
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	5.644	3.642
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.357	0.231
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.569	0.367
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	11.863	7.653
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	2.807	1.811
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.842	0.543
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.922	0.595
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.798	1.160
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.996	1.288
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.791	0.510
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.269	0.819
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.402	1.550
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.151	1.388
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.052	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.604	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.369	0.238
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.571	4.239
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.809	5.038
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.471	3.529
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.454	2.229
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.195	0.771
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	6.876	4.436
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.804	1.809
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	3.035	1.958
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.465	0.300
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.339	0.219

TABLE SHS-44
1972 MDC HEADS
MAJOR PIPES REHABILITATED
PIPE 10 REDUCED

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	253.3		138.3
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	253.4		193.4
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	253.0		213.0
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	257.2		147.2
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	256.8		116.8
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	254.9		214.9
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	259.3		164.3
8	8	10	0	0	30.0	14.646	9.449		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	260.9		180.9
10	9	103	0	0	100.0	10.311	6.652		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	260.9		210.9
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	260.9		180.9
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	259.1		134.1
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	250.2		220.2
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	248.5		228.5
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	246.3		226.3
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	245.0		225.0
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	245.3		205.3
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	244.4		224.4
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	244.4		224.4
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	245.5		225.5
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	244.6		224.6
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	244.6		224.6
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	228.2		208.2
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	228.1		208.1
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	228.3		208.3
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	227.6		207.6
28	32	33	48	0	25.0	-1.344	-0.880	KNOWN	243.8		218.8
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	228.0		208.0
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	244.0		224.0
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	250.0		210.0
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	257.2		162.2
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	257.2		147.2
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	257.1		182.1
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	257.5		177.5
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	258.1		178.1
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	256.2		181.2
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	255.9		195.9
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	257.3		237.3
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	253.9		233.9
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	259.2		189.2
42	72	76	77	0	40.0	15.125	9.758		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	255.4		235.4
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	243.8		193.8
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.5		210.5
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	241.0		181.0
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.1		222.1
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.7		192.7
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.2		151.2
50	47	88	31	99	60.0	6.153	3.970	KNOWN	264.7		204.7
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	244.0		224.0
52	103	34	91	0	80.0	42.143	27.189		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	259.8		139.8
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.7		136.7
55	104	60	36	0	60.0	4.595	2.965		264.0	KNOWN	204.0
56	74	0	0	0	100.0	2.920	1.884		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	254.1		229.1
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	261.3		186.3
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.3		205.3
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	260.3		220.3
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	247.6		67.6
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	256.6		211.6
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	248.8		148.8
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	246.9		156.9
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.5		154.5
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	255.9		195.9
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	255.6		195.6

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	0.517	0.334
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	2.636	1.700
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	1.107	0.714
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	2.239	1.445
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.671	2.368
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	26.150	16.871
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.153	0.744
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	4.986	3.217
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	17.460	11.264
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.263	0.170
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	10.172	6.562
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	4.903	3.163
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.233	0.151
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.671	0.433
58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.167	0.108
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	22.762	14.685
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.348	0.870
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	11.871	7.659
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	7.581	4.891
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	2.101	1.356
8	8	7	36.0	2400.0	135.0	0.0062	KNOWN	12.968	8.367
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	10.244	6.609
10	8	18	42.0	1920.0	2.0	5.6328	KNOWN	1.678	1.083
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	12.566	8.107
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	0.855	0.552
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	11	12	12.0	2600.0	135.0	1.4054	KNOWN	0.097	0.062
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	2.078	1.341
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	31.166	20.107
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	32.714	21.106
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	3.062	1.976
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	0.431	0.278
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	4.800	3.097
21	16	17	24.0	1200.0	135.0	0.0222	KNOWN	8.777	5.663
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	3.820	2.464
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	9.477	6.114
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	7.655	4.939
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	1.870	1.206
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	12.973	8.370
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	6.899	4.451
25	20	19	16.0	1000.0	135.0	0.1332	KNOWN	0.624	0.402
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	2.310	1.490
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	2.450	1.580
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.227	0.792
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	7.877	5.082
29	22	23	16.0	3050.0	135.0	0.4061	KNOWN	0.216	0.139
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	1.052	0.679
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	6.395	4.126
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	0.394	0.254
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.122	2.014
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	0.583	0.376
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.923	1.886
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.434	2.215
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	0.211	0.136
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	4.569	2.947
54	33	32	30.0	3300.0	135.0	0.0206	KNOWN	1.250	0.806
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.149	0.096
56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	4.344	2.803
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.775	0.500
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.544	0.996
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.642	0.414
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	8.377	5.405
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.121	0.723
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.475	0.307
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.503	0.325
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	10.167	6.560
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.164	0.106
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.163	0.105
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.388	2.831
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.046	0.675
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.989	1.283
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.500	0.323
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	5.738	3.702
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.378	0.244
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.384	0.248
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	13.901	8.968
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	2.920	1.884
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.846	0.546
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.832	0.537
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.866	1.204
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.994	1.286
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.794	0.512
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.267	0.818
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.403	1.551
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.155	1.390
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.052	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.605	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.370	0.239
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.574	4.242
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.821	5.046
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.474	3.532
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.450	2.226
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.201	0.775
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	7.173	4.628
87	65	54	20.0	16000.0	130.0	0.7787	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.818	1.818
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	3.321	2.143
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.448	0.289
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.262	0.169

TABLE SHS-45
STUDY DAY: 1966 OPERATION
NEW 36" PIPE AT NODE 4
ALL PIPES IN SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	241.9		126.9
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	246.5		186.5
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	245.6		205.6
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	247.5		137.5
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	243.3		103.3
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	248.1		208.1
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	249.5		154.5
8	8	10	0	0	30.0	27.660	17.845		250.0	KNOWN	220.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	250.1		170.1
10	9	103	0	0	100.0	9.889	6.380	KNOWN	253.9		153.9
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	244.7		194.7
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	250.3		170.3
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	249.4		124.4
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	235.9		205.9
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	241.4		221.4
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	240.8		220.8
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	241.3		221.3
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	247.7		207.7
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	237.8		217.8
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	237.7		217.7
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	236.0		216.0
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	233.3		213.3
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	231.6		211.6
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	213.7		193.7
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	213.4		193.4
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	213.9		193.9
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	212.3		192.3
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	229.6		204.6
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	213.3		193.3
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	229.3		209.3
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	235.9		195.9
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	244.3		149.3
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	237.2		127.2
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	235.8		160.8
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	233.1		153.1
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	232.2		152.2
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	228.7		153.7
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	219.8		159.8
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	224.2		204.2
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	216.6		196.6
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	231.8		161.8
42	72	76	77	0	40.0	1.845	1.190	KNOWN	231.8		191.8
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	219.2		199.2
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	223.6		173.6
45	78	80	82	0	40.0	2.247	1.450	KNOWN	230.2		190.2
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	220.8		160.8
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	241.5		201.5
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	242.2		172.2
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	240.7		130.7
50	47	88	31	99	60.0	6.153	3.970	KNOWN	244.2		184.2
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	236.8		216.8
52	103	34	91	0	80.0	29.012	18.718		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	239.3		119.3
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	236.2		116.2
55	104	60	36	0	60.0	20.704	13.358		250.1	KNOWN	190.1
56	74	0	0	0	100.0	0.636	0.410	KNOWN	232.4		132.4
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	216.8		191.8
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	246.2		171.2
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	248.3		188.3
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	240.6		200.6
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	247.8		67.8
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	248.0		203.0
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	229.2		129.2
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	228.2		138.2
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	239.0		134.0
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	225.3		165.3
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	219.8		159.8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.301	0.839
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.560	1.007
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.815	0.526
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.620	1.045
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.835	2.474
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	13.241	8.543
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.082	0.698
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.503	1.615
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	6.487	4.185
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.879	0.567
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	10.095	6.513
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	19.163	12.363
104	55	4	36.0	6400.0	134.0	0.0166	KNOWN	15.186	9.797
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	1.122	0.724
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.901	0.581
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	12.122	7.821
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.750	0.484
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	6.317	4.075
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.288	0.831
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.142	0.092
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	6.263	4.041
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	6.309	4.070
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	21.397	13.804
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	9.906	6.391
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	1.018	0.657
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	0.017	0.011
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.705	0.455
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.403	0.905
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	22.216	14.333
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	24.440	15.768
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.819	0.528
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.068	0.044
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.317	1.495
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.922	1.240
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.616	1.688
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	7.925	5.113
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	21.088	13.605
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.423	1.563
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	15.147	9.772
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	0.606	0.391
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.155	0.100
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.082	1.343
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.027	1.308
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.196	1.417
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.357	3.456
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.957	0.617
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.053	0.679
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.841	3.123
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.425	0.274
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.153	2.034
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.552	0.356
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.892	1.866
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.463	2.235
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.740	1.123
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	4.961	3.201
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	12.165	7.849
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.318	0.205
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	8.902	5.743
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	1.292	0.833
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.295	1.480
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.563	0.363
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	5.300	3.420
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.139	1.380
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.096	0.707
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.707	0.456
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	3.306	2.133
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.979	0.632
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.581	0.375
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.349	1.515
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.386	0.894
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.469	0.303
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.761	0.491
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.624	2.338
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.663	0.428
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.339	0.219
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	0.522	0.336
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	0.636	0.410
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.584	0.377
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.426	0.275
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.402	0.905
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.978	1.276
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.799	0.515
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.553	1.002
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.394	1.545
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.126	1.371
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.051	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.603	0.389
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.368	0.237
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.548	4.224
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.784	5.022
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.447	3.514
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.395	2.190
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.161	0.749
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	4.555	2.939
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.030	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.224	2.080
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.773	0.499
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.329	0.212
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.305	0.842

TABLE SHS-46
STUDY DAY: 1966 OPERATION
NEW 36"PIPE AT NODE 4
PIPE 50 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	242.6		127.6
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	247.1		187.1
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	246.2		206.2
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	243.9		133.9
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	240.0		100.0
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	248.8		208.8
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	249.7		154.7
8	8	10	0	0	30.0	25.034	16.151		250.0	KNOWN	220.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	250.4		170.4
10	9	103	0	0	100.0	9.889	6.380	KNOWN	253.9		153.9
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	245.1		195.1
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	251.9		171.9
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	251.4		126.4
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	234.4		204.4
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	241.7		221.7
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	241.0		221.0
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	241.5		221.5
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	247.9		207.9
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	238.0		218.0
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	237.9		217.9
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	236.0		216.0
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	233.1		213.1
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	231.6		211.6
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	213.0		193.0
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	212.8		192.8
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	213.3		193.3
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	211.7		191.7
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	228.4		203.4
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	212.7		192.7
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	229.2		209.2
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	234.0		194.0
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	240.9		145.9
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	234.1		124.1
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	233.4		158.4
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	230.2		150.2
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	229.4		149.4
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	225.8		150.8
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	217.0		157.0
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	221.3		201.3
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	213.8		193.8
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	228.9		158.9
42	72	76	77	0	40.0	1.845	1.190	KNOWN	228.9		188.9
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	216.3		196.3
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	222.7		172.7
45	78	80	82	0	40.0	2.247	1.450	KNOWN	229.5		189.5
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	220.0		160.0
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	241.3		201.3
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	242.0		172.0
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	240.4		130.4
50	47	88	31	99	60.0	6.153	3.970	KNOWN	244.0		184.0
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	237.0		217.0
52	103	34	91	0	80.0	22.110	14.264		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	239.0		119.0
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	235.9		115.9
55	104	60	36	0	60.0	30.233	19.505		250.1	KNOWN	190.1
56	74	0	0	0	100.0	0.636	0.410	KNOWN	229.5		129.5
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	213.9		188.9
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	246.5		171.5
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	248.2		188.2
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	241.0		201.0
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	248.2		68.2
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	248.9		203.9
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	228.2		128.2
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	227.4		137.4
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	238.7		133.7
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	222.4		162.4
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	216.9		156.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.300	0.839
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.712	1.104
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.966	0.623
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.691	1.091
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.906	2.520
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	13.602	8.776
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.206	0.778
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.588	1.670
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	6.709	4.329
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.846	0.546
50	13	4	36.0	3400.0	0.0	99.9999	KNOWN	0.000	0.000
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	18.366	11.849
104	55	4	36.0	6400.0	134.0	0.0166	KNOWN	24.410	15.748
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	1.095	0.706
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.840	0.542
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	9.992	6.446
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.655	0.423
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	9.248	5.966
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.893	1.221
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.164	0.106
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	4.313	2.782
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	6.104	3.938
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	20.686	13.346
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	9.600	6.193
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	1.011	0.652
103	10	52	24.0	2400.0	45.0	0.3386	KNOWN	0.212	0.137
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.780	0.503
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.328	0.857
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	15.520	10.013
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	17.823	11.499
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.142	0.737
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.320	0.206
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.402	1.550
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.810	1.167
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.637	1.701
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	8.099	5.225
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	20.987	13.540
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.422	1.563
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	15.159	9.780
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	1.213	0.783
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.145	0.094
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.091	1.349
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.038	1.315
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.303	1.486
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.424	3.499
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.911	0.588
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.206	0.778
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.862	3.137
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.371	0.239
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.099	1.999
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.605	0.391
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.946	1.901
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.257	2.101
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.773	1.144
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	4.479	2.890
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	11.877	7.663
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.227	0.146
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	8.705	5.616
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	1.411	0.910
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.496	1.610
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.494	0.319
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	5.225	3.371
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.137	1.378
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.095	0.707
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.708	0.457
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	3.230	2.084
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.978	0.631
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.580	0.374
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.351	1.517
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.386	0.894
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.471	0.304
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.761	0.491
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.626	2.340
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.664	0.428
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.339	0.219
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	0.674	0.435
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	0.635	0.410
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.505	0.326
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.426	0.275
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.402	0.905
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.015	1.300
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.782	0.505
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.579	1.019
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.411	1.555
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.178	1.405
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.052	0.679
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.606	0.391
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.371	0.240
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.596	4.256
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.834	5.054
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.496	3.546
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.479	2.245
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.193	0.770
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	4.572	2.950
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.030	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.287	2.120
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.705	0.455
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.292	0.188
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.303	0.841

TABLE SHS-47
STUDY DAY: 1966 OPERATION
NEW 36" PIPE AT NODE 4
PIPE 50 REHABILITATED

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	241.0		126.8
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	246.3		186.3
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	245.5		205.5
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	248.1		138.1
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	243.8		103.8
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	247.9		207.9
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	249.4		154.4
8	8	10	0	0	30.0	28.288	18.251		250.0	KNOWN	220.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	250.1		170.1
10	9	103	0	0	100.0	9.889	6.380	KNOWN	253.9		153.9
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	244.6		194.6
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	250.0		170.0
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	249.0		124.0
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	236.3		206.3
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	241.3		221.3
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	240.7		220.7
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	241.2		221.2
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	247.7		207.7
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	237.7		217.7
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	237.7		217.7
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	235.9		215.9
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	233.3		213.3
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	231.6		211.6
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	213.8		193.8
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	213.5		193.5
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	213.9		193.9
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	212.4		192.4
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	229.7		204.7
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	213.3		193.3
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	229.3		209.3
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	236.1		196.1
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	244.8		149.8
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	237.6		127.6
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	236.1		161.1
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	233.5		153.5
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	232.7		152.7
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	229.1		154.1
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	220.3		160.3
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	224.6		204.6
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	217.1		197.1
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	232.2		162.2
42	72	76	77	0	40.0	1.845	1.190	KNOWN	232.2		192.2
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	219.6		199.6
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	223.8		173.8
45	78	80	82	0	40.0	2.247	1.450	KNOWN	230.3		190.3
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	220.9		160.9
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	241.6		201.6
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	242.3		172.3
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	240.7		130.7
50	47	88	31	99	60.0	6.153	3.970	KNOWN	244.2		184.2
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	236.7		216.7
52	103	34	91	0	80.0	30.310	19.555		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	239.3		119.3
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	236.2		116.2
55	104	60	36	0	60.0	18.778	12.115		250.1	KNOWN	190.1
56	74	0	0	0	100.0	0.636	0.410	KNOWN	232.8		132.8
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	217.2		192.2
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	246.2		171.2
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	248.3		188.3
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	240.5		200.5
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	247.7		67.7
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	247.8		202.8
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	229.4		129.4
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	228.3		138.3
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	239.1		134.1
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	225.8		165.8
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	220.2		160.2

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.295	0.836
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.526	0.985
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.775	0.500
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	1.588	1.025
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.829	2.470
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	13.133	8.473
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.050	0.677
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.487	1.604
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	6.444	4.158
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.885	0.571
50	13	4	36.0	3400.0	135.0	0.0087	KNOWN	12.110	7.813
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	19.308	12.457
104	55	4	36.0	6400.0	134.0	0.0166	KNOWN	13.295	8.578
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	1.126	0.726
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.910	0.587
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	12.596	8.126
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.773	0.498
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	5.603	3.615
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.093	0.705
89	6	62	16.0	3200.0	50.0	2.6763	KNOWN	0.179	0.115
8	8	7	36.0	2400.0	75.0	0.0183	KNOWN	6.667	4.301
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	6.377	4.114
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	21.619	13.948
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	9.998	6.450
12	9	58	16.0	3700.0	45.0	3.7605	KNOWN	1.020	0.658
103	10	52	24.0	2400.0	45.0	0.3386	KNOWN	0.162	0.104
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.689	0.444
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.418	0.915
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	23.436	15.120
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	25.644	16.544
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	0.744	0.480
46	14	31	16.0	5000.0	60.0	2.9845	KNOWN	0.238	0.154
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.302	1.485
21	17	16	24.0	1200.0	50.0	0.1393	KNOWN	1.949	1.258
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.611	1.685
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	7.901	5.098
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	21.116	13.623
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.423	1.564
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	15.147	9.772
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	0.409	0.264
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.158	0.102
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.080	1.342
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.025	1.306
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	2.182	1.408
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.348	3.450
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.963	0.621
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	1.033	0.666
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.838	3.121
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.431	0.278
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.159	2.038
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.545	0.352
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.886	1.862
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.490	2.252
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.737	1.120
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	5.059	3.264
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	12.209	7.877
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.330	0.213
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	8.934	5.764
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	1.272	0.821
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.263	1.460
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.573	0.370
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	5.311	3.426
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.140	1.380
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.096	0.707
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.707	0.456
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	3.318	2.140
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.979	0.632
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.581	0.375
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.349	1.515
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.386	0.894
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.469	0.303
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.761	0.491
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.624	2.338
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.664	0.428
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.339	0.219
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	0.586	0.378
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	0.636	0.410
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.595	0.384
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.426	0.275
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.402	0.905
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.973	1.273
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.801	0.517
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.550	1.000
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.392	1.543
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.118	1.366
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.051	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.603	0.389
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.367	0.237
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.540	4.219
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.777	5.017
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.439	3.509
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.382	2.182
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.156	0.746
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	4.556	2.940
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.030	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.215	2.074
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	0.786	0.507
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.334	0.215
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.305	0.842

TABLE SHS-48
STUDY DAY: 1966 OPERATION
UNKNOWN PIPE SIZE AT NODE 4

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	232.1		117.1
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	232.5		172.5
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	231.0		191.0
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	248.3		138.3
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	243.5		103.5
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	233.7		193.7
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	233.6		138.6
8	8	10	0	0	30.0	0.000	0.000	KNOWN	230.6		200.6
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	236.3		156.3
10	9	103	0	0	100.0	9.889	6.380	KNOWN	245.2		145.2
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	236.1		186.1
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	249.1		169.1
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	247.8		122.8
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	228.3		198.3
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	225.2		205.2
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	224.4		204.4
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	224.3		204.3
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	229.3		189.3
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	221.0		201.0
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	221.0		201.0
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	220.5		200.5
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	219.1		199.1
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	216.5		196.5
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	201.1		181.1
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	200.5		180.5
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	200.7		180.7
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	199.2		179.2
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	219.0		194.0
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	200.1		180.1
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	214.2		194.2
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	229.6		189.6
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	244.4		149.4
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	237.3		127.3
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	235.8		160.8
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	233.1		153.1
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	232.3		152.3
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	228.7		153.7
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	219.9		159.9
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	224.2		204.2
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	216.7		196.7
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	231.8		161.8
42	72	76	77	0	40.0	1.845	1.190	KNOWN	231.8		191.8
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	219.2	KNOWN	199.2
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	222.8		172.8
45	78	80	82	0	40.0	2.247	1.450	KNOWN	229.0		189.0
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	219.8		159.8
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	239.7		199.7
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	240.4		170.4
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	238.9		128.9
50	47	88	31	99	60.0	6.153	3.970	KNOWN	242.4		182.4
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	220.0		200.0
52	103	34	91	0	80.0	39.941	25.768		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	237.5		117.5
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	234.4		114.4
55	104	60	36	0	60.0	37.435	24.152		250.1	KNOWN	190.1
56	74	0	0	0	100.0	0.636	0.410	KNOWN	232.4		132.4
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	216.8		191.8
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	236.9		161.9
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	246.2		186.2
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	231.9		191.9
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	231.5		51.5
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	238.4		193.4
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	228.5		128.5
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	227.5		137.5
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	237.3		132.3
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	225.4		165.4
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	219.8		159.8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.351	0.226
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	2.334	1.506
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.639	0.412
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	2.122	1.369
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.388	2.186
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	13.922	8.982
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.551	0.355
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.977	1.921
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	7.727	4.985
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.937	0.604
50	4	13	36.0	3400.0	75.0	0.0259	KNOWN	4.699	3.031
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	20.991	13.543
104	55	4	106.0	6400.0	134.0	0.0030	KNOWN	31.870	20.561
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	1.078	0.695
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.914	0.590
6	6	7	36.0	1760.0	75.0	0.0134	KNOWN	2.985	1.926
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.854	0.551
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	22.749	14.677
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	3.973	2.563
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	1.347	0.869
8	7	8	36.0	2400.0	75.0	0.0183	KNOWN	15.888	10.250
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	13.353	8.615
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	15.888	10.250
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	15.674	10.112
12	58	9	16.0	3700.0	45.0	3.7605	KNOWN	0.361	0.233
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	5.785	3.732
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	1.109	0.715
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	0.999	0.645
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	26.117	16.850
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	28.745	18.545
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	2.308	1.489
46	31	14	16.0	5000.0	60.0	2.9845	KNOWN	0.639	0.412
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.791	1.801
21	16	17	24.0	1200.0	50.0	0.1393	KNOWN	0.540	0.349
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.758	1.779
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	7.034	4.538
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	18.264	11.783
24	17	19	20.0	4500.0	70.0	0.6813	KNOWN	2.353	1.518
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	14.855	9.584
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	3.291	2.123
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.056	0.036
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.111	1.362
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.070	1.335
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.548	0.999
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.114	3.300
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	1.213	0.782
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.149	0.096
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.855	3.132
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.631	0.407
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.359	2.167
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.346	0.223
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.686	1.733
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	4.574	2.951
43	51	30	16.0	3200.0	50.0	2.6763	KNOWN	1.520	0.981
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	6.778	4.373
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	12.220	7.884
55	33	34	12.0	4800.0	60.0	11.6306	KNOWN	0.328	0.211
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	8.948	5.773
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	1.281	0.826
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.294	1.480
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.597	0.385
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	5.333	3.441
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.140	1.381
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.097	0.708
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.707	0.456
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	3.338	2.154
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.980	0.632
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.581	0.375
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.348	1.515
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.386	0.894
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.469	0.302
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.761	0.491
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.623	2.338
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.663	0.428
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.340	0.219
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	0.439	0.283
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	0.636	0.410
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.618	0.399
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.426	0.275
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.402	0.905
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.927	1.243
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.821	0.530
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.592	1.027
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.372	1.531
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.052	1.324
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.050	0.677
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.599	0.386
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.362	0.234
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.479	4.180
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.715	4.978
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.914	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.379	3.470
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.274	2.113
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.114	0.719
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.410	3.490
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.276	2.114
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	1.748	1.128
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.316	0.204
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.306	0.842

TABLE SHS-49
STUDY DAY: 1966 OPERATION
MAJOR PIPES REHABILITATED
UNKNOWN PIPE SIZE AT NODE 4

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	238.7		123.7
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	239.0		179.0
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	238.4		198.4
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	242.1		132.1
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	241.2		101.2
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	239.4		199.4
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	239.5		144.5
8	8	10	0	0	30.0	0.000	0.000	KNOWN	238.9		208.9
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	240.4		160.4
10	9	103	0	0	100.0	9.889	6.380	KNOWN	242.5		142.5
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	244.0		194.0
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	245.1		165.1
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	242.6		117.6
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	237.0		207.0
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	235.7		215.7
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	235.3		215.3
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	235.2		215.2
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	238.2		198.2
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	233.7		213.7
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	233.6		213.6
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	234.6		214.6
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	234.0		214.0
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	233.6		213.6
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	228.4		208.4
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	228.3		208.3
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	228.4		208.4
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	226.9		206.9
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	234.0		209.0
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	227.8		207.8
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	232.8		212.8
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	237.1		197.1
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	241.2		146.2
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	236.2		126.2
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	240.9		165.9
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	233.1		153.1
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	232.3		152.3
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	228.7		153.7
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	219.9		159.9
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	224.2		204.2
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	216.7		196.7
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	231.8		161.8
42	72	76	77	0	40.0	1.845	1.190	KNOWN	231.9		191.9
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	219.2	KNOWN	199.2
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	227.0		177.0
45	78	80	82	0	40.0	2.247	1.450	KNOWN	234.6		194.6
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	224.7		164.7
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	248.0		208.0
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	248.7		178.7
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	247.1		137.1
50	47	88	31	99	60.0	6.153	3.970	KNOWN	250.8		190.8
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	232.7		212.7
52	103	34	91	0	80.0	55.276	35.662		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	245.7		125.7
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	242.5		122.5
55	104	60	36	0	60.0	22.100	14.258		250.1	KNOWN	190.1
56	74	0	0	0	100.0	0.636	0.410	KNOWN	232.4		132.4
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	216.8		191.8
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	244.1		169.1
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	251.4		191.4
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	239.8		199.8
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	238.8		58.8
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	240.6		195.6
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	233.2		133.2
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	231.1		141.1
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	245.3		140.3
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	225.3		165.3
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	219.8		159.8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	0.714	0.461
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	2.119	1.367
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	0.789	0.509
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	2.537	1.637
4	6	2	24.0	1600.0	135.0	0.0296	KNOWN	4.166	2.688
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	18.371	11.852
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	0.778	0.502
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	3.804	2.454
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	11.536	7.443
51	4	5	12.0	1900.0	135.0	1.8270	KNOWN	0.933	0.602
50	13	4	36.0	3400.0	135.0	0.0087	KNOWN	9.513	6.137
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	17.598	11.354
104	55	4	57.8	6400.0	134.0	0.0571	KNOWN	14.457	9.327
53	32	5	16.0	2000.0	135.0	0.2663	KNOWN	0.495	0.319
58	5	34	12.0	3200.0	135.0	1.7297	KNOWN	0.328	0.211
6	7	6	36.0	1760.0	135.0	0.0045	KNOWN	4.344	2.803
11	9	6	16.0	3400.0	135.0	0.4527	KNOWN	1.474	0.951
90	13	6	36.0	5000.0	135.0	0.0128	KNOWN	19.719	12.722
30	6	61	24.0	2400.0	135.0	0.0444	KNOWN	4.061	2.620
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	1.743	1.124
8	7	8	36.0	2400.0	135.0	0.0062	KNOWN	11.455	7.391
7	9	7	36.0	1920.0	135.0	0.0049	KNOWN	16.249	10.483
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	11.455	7.391
9	10	9	36.0	4700.0	135.0	0.0121	KNOWN	16.557	10.682
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	2.995	1.933
103	52	10	24.0	2400.0	45.0	0.3386	KNOWN	6.668	4.302
14	12	11	12.0	2600.0	135.0	1.4054	KNOWN	0.877	0.566
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	1.231	0.794
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	37.480	24.181
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	39.877	25.727
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	2.704	1.744
46	31	14	16.0	5000.0	135.0	0.6658	KNOWN	0.261	0.169
20	15	16	20.0	800.0	135.0	0.0359	KNOWN	3.618	2.334
21	16	17	24.0	1200.0	135.0	0.0222	KNOWN	1.832	1.182
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	3.694	2.383
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	9.442	6.092
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	13.920	8.981
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	3.021	1.949
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	11.135	7.184
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	3.379	2.180
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.772	0.498
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.063	1.331
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	3.722	2.401
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	0.940	0.606
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	8.130	5.245
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	0.463	0.299
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	0.286	0.185
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	7.121	4.594
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	0.480	0.310
33	28	24	16.0	4800.0	135.0	0.6392	KNOWN	3.208	2.070
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	0.496	0.320
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	30	26	16.0	4800.0	135.0	0.6392	KNOWN	2.837	1.830
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	135.0	0.2131	KNOWN	4.282	2.762
43	30	51	16.0	3200.0	135.0	0.4261	KNOWN	0.595	0.384
49	32	31	22.0	5120.0	135.0	0.1446	KNOWN	6.110	3.942
54	32	33	30.0	3300.0	70.0	0.0694	KNOWN	10.079	6.503
55	34	33	12.0	4800.0	60.0	11.6306	KNOWN	0.614	0.396
56	33	35	30.0	3400.0	70.0	0.0715	KNOWN	7.748	4.999
57	34	35	16.0	4800.0	80.0	1.6827	KNOWN	2.302	1.485
60	55	34	16.0	3680.0	135.0	0.4900	KNOWN	4.860	3.136
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.614	0.396
62	35	36	30.0	1800.0	70.0	0.0378	KNOWN	5.162	3.331
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	2.134	1.377
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	1.094	0.706
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.709	0.458
75	36	41	30.0	2400.0	70.0	0.0504	KNOWN	3.166	2.043
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.977	0.631
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.580	0.374
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.353	1.518
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.386	0.894
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.472	0.304
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.762	0.491
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.628	2.341
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.664	0.429
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.339	0.219
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	0.741	0.478
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	0.635	0.410
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.440	0.284
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.425	0.274
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.402	0.904
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.137	1.378
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.725	0.468
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.466	0.946
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.468	1.592
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.357	1.521
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.055	0.680
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.616	0.397
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.384	0.248
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.762	4.363
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	8.003	5.163
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.662	3.653
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.730	2.406
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.264	0.816
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	8.731	5.633
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.982	1.924
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	4.613	2.976
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.483	0.312
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.302	0.840

TABLE SHS-50
STUDY DAY: 1966 OPERATION
PIPE 90 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	- STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	257.6		142.6
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	257.9		197.9
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	257.9		217.9
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	259.2		149.2
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	258.6		118.6
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	258.5		218.5
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	260.0		165.0
8	8	10	0	0	30.0	28.360	18.297		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	261.6		181.6
10	9	103	0	0	100.0	9.509	6.135		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	262.2		212.2
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	263.4		183.4
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	262.4		137.4
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	254.9		224.9
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	257.0		237.0
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	256.7		236.7
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	256.9		236.9
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	259.1		219.1
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	255.9		235.9
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	255.9		235.9
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	256.0		236.0
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	254.8		234.8
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	255.1		235.1
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	237.5		217.5
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	237.4		217.4
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	237.7		217.7
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	236.9		216.9
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	251.9		226.9
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	237.3		217.3
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	254.7		234.7
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	254.8		214.8
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	259.0		164.0
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	258.9		148.9
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	258.6		183.6
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	258.9		178.9
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	259.1		179.1
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	257.2		182.2
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	256.4		196.4
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	257.8		237.8
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	253.9		233.9
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	259.5		189.5
42	72	76	77	0	40.0	11.338	7.311		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	255.9		235.9
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	244.0		194.0
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.7		210.7
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	241.2		181.2
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.2		222.2
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.9		192.9
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.4		151.4
50	47	88	31	99	60.0	6.153	3.970	KNOWN	264.9		204.9
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	255.6		235.6
52	103	34	91	0	80.0	33.668	21.721		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	260.0		140.0
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.9		136.9
55	104	60	36	0	60.0	4.155	2.681		264.0	KNOWN	204.0
56	74	0	0	0	100.0	2.721	1.756		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	254.4		229.4
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	262.4		187.4
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.5		205.5
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	261.7		221.7
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	258.8		78.8
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	260.0		215.0
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	249.2		149.2
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	247.2		157.2
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.7		154.7
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	256.7		196.7
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	256.2		196.2

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE - R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	0.702	0.453
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	2.371	1.530
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	1.027	0.663
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	0.606	0.391
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.223	1.434
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	14.143	9.125
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.185	0.765
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	1.979	1.276
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	6.796	4.384
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.321	0.207
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	13.507	8.714
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	7.949	5.128
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.002	0.001
53	32	5	16.0	2000.0	75.0	0.7980	KNOWN	0.754	0.486
58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.027	0.017
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	12.671	8.175
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.947	0.611
90	13	6	36.0	5000.0	0.0	99.9999	KNOWN	0.002	0.001
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	1.417	0.914
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	2.011	1.297
8	8	7	36.0	2400.0	135.0	0.0062	KNOWN	2.847	1.837
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	10.272	6.627
10	8	18	42.0	1920.0	135.0	0.0023	KNOWN	25.512	16.460
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	11.764	7.590
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	1.285	0.829
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	12	11	12.0	2600.0	135.0	1.4054	KNOWN	0.887	0.572
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	1.221	0.788
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	22.283	14.376
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	24.682	15.924
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	2.972	1.917
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	0.383	0.247
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	1.792	1.156
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	3.450	2.226
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	2.488	1.605
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	9.364	6.042
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	22.499	14.515
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	2.419	1.561
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	15.033	9.699
92	18	61	20.0	1440.0	135.0	0.0647	KNOWN	2.099	1.354
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.212	0.137
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	2.022	1.304
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	1.955	1.261
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.410	0.910
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	7.582	4.892
29	23	22	16.0	3050.0	135.0	0.4061	KNOWN	0.862	0.556
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	2.086	1.346
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	5.248	3.386
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	0.263	0.170
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.991	1.930
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	0.713	0.460
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	3.054	1.970
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.269	1.464
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	1.495	0.965
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.451	2.227
54	32	33	30.0	3300.0	135.0	0.0206	KNOWN	2.830	1.826
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.320	0.207
56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	0.439	0.283
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.688	0.444
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.358	0.876
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.682	0.440
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	4.596	2.965
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.265	0.816
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.549	0.354
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.496	0.320
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	6.379	4.116
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.269	0.174
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.206	0.133
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.214	2.719
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.121	0.723
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.890	1.219
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.528	0.341
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	5.578	3.598
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.342	0.221
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.572	0.369
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	10.151	6.549
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	2.721	1.756
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.840	0.542
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.924	0.596
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.831	1.181
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.996	1.287
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.791	0.510
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.272	0.821
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.402	1.550
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.150	1.387
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.051	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.604	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.369	0.238
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.570	4.239
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.808	5.037
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.470	3.529
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.449	2.225
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.190	0.768
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	6.730	4.342
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.795	1.804
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	2.894	1.867
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.477	0.307
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.382	0.247

TABLE SHS-51
STUDY DAY: 1966 OPERATION
PIPE 6 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVENT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	256.7		141.7
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	257.4		197.4
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	257.4		217.4
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	257.8		147.8
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	257.3		117.3
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	258.1		218.1
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	260.3		165.3
8	8	10	0	0	30.0	17.882	11.537		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	261.7		181.7
10	9	103	0	0	100.0	9.397	6.063		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	261.3		211.3
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	261.2		181.2
13	16	50	90	15	125.0	-3.420	-2.210	KNOWN	259.6		134.6
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	254.0		224.0
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	256.7		236.7
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	256.4		236.4
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	256.7		236.7
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	259.0		219.0
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	255.6		235.6
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	255.6		235.6
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	255.7		235.7
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	254.5		234.5
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	254.8		234.8
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	237.0		217.0
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	237.0		217.0
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	237.2		217.2
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	236.5		216.5
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	251.3		226.3
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	236.9		216.9
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	254.4		234.4
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	253.9		213.9
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	257.7		162.7
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	257.7		147.7
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	257.5		182.5
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	257.9		177.9
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	258.4		178.4
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	256.5		181.5
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	256.0		196.0
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	257.4		237.4
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	253.5		233.5
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	259.3		189.3
42	72	76	77	0	40.0	14.191	9.155		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	255.5		235.5
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	243.9		193.9
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.6		210.6
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	241.1		181.1
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.1		222.1
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.8		192.8
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.3		151.3
50	47	88	31	99	60.0	6.153	3.970	KNOWN	264.8		204.8
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	255.4		235.4
52	103	34	91	0	80.0	40.886	26.378		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	259.9		139.9
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.8		136.8
55	104	60	36	0	60.0	4.524	2.919		264.0	KNOWN	204.0
56	74	0	0	0	100.0	2.867	1.850		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	253.9		228.9
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	261.8		186.8
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.4		205.4
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	260.8		220.8
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	258.6		78.6
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	258.5		213.5
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	248.9		148.9
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	247.8		157.8
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.6		154.6
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	256.1		196.1
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	255.7		195.7

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	1.236	0.798
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	1.815	1.171
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	1.005	0.648
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	0.142	0.092
4	6	2	24.0	1600.0	60.0	0.1526	KNOWN	2.299	1.483
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	14.123	9.112
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.278	0.824
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	1.853	1.195
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	6.351	4.097
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.267	0.172
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	9.931	6.407
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	4.649	2.999
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.223	0.144
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.691	0.446
58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.140	0.091
6	7	6	36.0	1760.0	0.0	99.9999	KNOWN	0.002	0.001
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.027	0.663
90	13	6	36.0	5000.0	135.0	0.0128	KNOWN	13.206	8.520
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	1.875	1.210
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	0.994	0.641
8	7	8	36.0	2400.0	135.0	0.0062	KNOWN	8.780	5.665
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	9.232	5.956
10	8	18	42.0	1920.0	135.0	0.0023	KNOWN	26.662	17.201
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	11.652	7.518
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	0.436	0.281
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	11	12	12.0	2600.0	135.0	1.4054	KNOWN	0.199	0.128
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	2.306	1.488
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	30.335	19.571
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	31.656	20.423
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	1.955	1.261
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	0.454	0.293
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	1.667	1.075
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	4.011	2.588
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	2.412	1.556
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	9.430	6.084
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	23.192	14.963
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	2.446	1.578
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	15.138	9.766
92	18	61	20.0	1440.0	135.0	0.0647	KNOWN	2.557	1.650
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.257	0.166
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	2.004	1.293
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	1.925	1.242
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.445	0.932
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	7.613	4.912
29	23	22	16.0	3050.0	135.0	0.4061	KNOWN	0.933	0.602
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	2.192	1.414
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	5.208	3.360
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	0.246	0.159
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.974	1.919
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	0.730	0.471
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	3.070	1.981
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.147	1.385
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	1.551	1.001
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.257	2.102
54	33	32	30.0	3300.0	135.0	0.0206	KNOWN	0.331	0.214
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.223	0.144
56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	3.382	2.182
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.737	0.476
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.491	0.962
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.653	0.421
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	7.445	4.804
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.164	0.751
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.498	0.321
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.501	0.323
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	9.234	5.957
64	37	38	12.0	2700.0	50.0	9.1066	KNOWN	0.201	0.130
66	37	66	12.0	2700.0	50.0	9.1066	KNOWN	0.177	0.114
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.354	2.809
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.123	0.724
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.961	1.265
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.534	0.345
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	5.697	3.676
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.368	0.238
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.566	0.365
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	12.978	8.373
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	2.867	1.850
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.844	0.544
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.916	0.591
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.893	1.221
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.997	1.288
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.790	0.510
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.267	0.817
80	45	46	16.0	9600.0	110.0	1.8072	KNOWN	2.403	1.550
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.152	1.388
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.052	0.678
47	50	47	12.0	2400.0	55.0	6.8389	KNOWN	0.605	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.370	0.238
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.572	4.240
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.810	5.038
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.914	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.472	3.530
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.459	2.232
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.198	0.773
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	6.976	4.501
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.810	1.813
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	3.130	2.019
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.457	0.295
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.304	0.196

TABLE SHS-52
STUDY DAY: 1966 OPERATION
PIPE 7 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVENT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	257.8		142.8
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	258.8		198.8
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	258.8		218.8
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	258.4		148.4
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	257.8		117.8
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	259.5		219.5
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	259.7		164.7
8	8	10	0	0	30.0	29.679	19.148		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	265.8		185.8
10	9	103	0	0	100.0	2.632	1.698		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	263.6		213.6
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	262.1		182.1
13	16	50	90	15	125.0	-3.420	-2.210	KNOWN	260.6		135.6
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	255.0		225.0
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	257.7		237.7
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	257.2		237.2
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	257.4		237.4
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	259.3		219.3
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	256.3		236.3
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	256.3		236.3
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	256.5		236.5
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	255.3		235.3
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	255.6		235.6
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	237.8		217.8
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	237.8		217.8
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	238.0		218.0
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	237.3		217.3
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	252.1		227.1
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	237.7		217.7
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	255.2		235.2
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	254.7		214.7
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	258.3		163.3
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	258.2		148.2
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	258.0		183.0
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	258.3		178.3
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	258.7		178.7
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	256.8		181.8
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	256.2		196.2
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	257.6		237.6
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	253.7		233.7
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	259.4		189.4
42	72	76	77	0	40.0	13.065	8.429		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	255.7		235.7
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	244.2		194.2
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.9		210.9
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	241.4		181.4
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.6		222.6
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	263.3		193.3
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.7		151.7
50	47	88	31	99	60.0	6.153	3.970	KNOWN	265.3		205.3
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	256.1		236.1
52	103	34	91	0	80.0	37.126	23.952		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	260.4		140.4
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	257.2		137.2
55	104	60	36	0	60.0	4.435	2.862		264.0	KNOWN	204.0
56	74	0	0	0	100.0	2.807	1.811		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	254.1		229.1
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	264.5		189.5
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.9		205.9
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	263.1		223.1
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	259.3		79.3
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	259.8		214.8
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	249.2		149.2
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	247.2		157.2
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	260.1		155.1
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	256.4		196.4
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	255.9		195.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	1.354	0.873
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	1.751	1.129
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	1.058	0.683
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	0.309	0.199
4	6	2	24.0	1600.0	60.0	0.1526	KNOWN	2.577	1.662
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	15.924	10.273
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.356	0.875
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	2.267	1.463
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	7.819	5.045
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.283	0.182
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	11.054	7.132
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	5.744	3.706
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.212	0.137
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.708	0.457
58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.109	0.071
6	7	6	36.0	1760.0	135.0	0.0045	KNOWN	7.438	4.799
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.377	0.888
90	13	6	36.0	5000.0	135.0	0.0128	KNOWN	10.768	6.947
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.103	0.712
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	0.705	0.455
8	8	7	36.0	2400.0	135.0	0.0062	KNOWN	7.884	5.086
7	9	7	36.0	1920.0	0.0	99.9999	KNOWN	0.003	0.002
10	8	18	42.0	1920.0	135.0	0.0023	KNOWN	21.795	14.061
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	4.887	3.153
12	9	58	16.0	3700.0	135.0	0.4927	KNOWN	1.678	1.082
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	11	12	12.0	2600.0	135.0	1.4054	KNOWN	1.052	0.678
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	3.160	2.038
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	28.664	18.493
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	29.132	18.795
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	1.666	1.075
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	0.585	0.378
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.081	1.343
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	2.407	1.553
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	2.607	1.682
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	9.515	6.139
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	21.304	13.745
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	2.384	1.538
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	14.916	9.623
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	0.617	0.398
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.142	0.091
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	2.056	1.327
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	2.005	1.293
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.451	0.936
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	7.692	4.962
29	23	22	16.0	3050.0	135.0	0.4061	KNOWN	0.923	0.596
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	2.189	1.412
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	5.296	3.417
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	0.248	0.160
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.976	1.920
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	0.729	0.470
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	3.069	1.980
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.151	1.388
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	1.462	0.943
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.132	2.020
54	32	33	30.0	3300.0	135.0	0.0206	KNOWN	0.990	0.639
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.280	0.181
56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	2.235	1.442
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.711	0.459
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.435	0.926
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.658	0.425
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	6.335	4.087
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.209	0.780
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.521	0.336
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.499	0.322
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	8.120	5.239
64	37	38	12.0	2700.0	50.0	9.1066	KNOWN	0.232	0.150
66	37	66	12.0	2700.0	50.0	9.1066	KNOWN	0.190	0.122
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.291	2.769
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.122	0.724
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.928	1.244
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.532	0.343
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	5.644	3.641
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.357	0.231
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.569	0.367
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	11.871	7.659
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	2.807	1.811
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.836	0.539
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.918	0.593
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.895	1.223
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.008	1.296
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.785	0.507
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.258	0.812
80	45	46	16.0	9600.0	110.0	1.8072	KNOWN	2.408	1.553
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.168	1.399
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.052	0.679
47	50	47	12.0	2400.0	55.0	6.8389	KNOWN	0.605	0.391
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.371	0.239
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.587	4.250
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.825	5.048
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.914	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.487	3.540
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.484	2.248
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.205	0.778
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	5.738	3.702
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.789	1.800
81	59	58	12.0	800.0	135.0	1.4324	KNOWN	1.870	1.206
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.468	0.302
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.338	0.218

TABLE SHS-53
STUDY DAY: 1966 OPERATION
PIPE 9 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	257.7		142.7
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	258.6		198.6
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	258.6		218.6
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	258.2		148.2
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	257.7		117.7
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	259.4		219.4
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	259.6		164.6
8	8	10	0	0	30.0	31.695	20.448		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	259.6		179.6
10	9	103	0	0	100.0	-2.255	-1.453		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	260.8		210.8
12	14	15	34	0	80.0	-1.519	-0.980	KNOW	261.7		181.7
13	16	50	90	15	125.0	-3.426	-2.210	KNOW	260.3		135.3
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	254.8		224.8
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	257.6		237.6
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	257.2		237.2
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	257.3		237.3
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	259.3		219.3
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	256.3		236.3
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	256.3		236.3
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	256.4		236.4
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	255.2		235.2
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	255.5		235.5
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	237.7		217.7
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	237.7		217.7
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	237.9		217.9
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	237.2		217.2
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	252.0		227.0
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	237.6		217.6
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	255.1		235.1
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	254.6		214.6
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	258.1		163.1
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	258.1		148.1
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	257.9		182.9
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	258.2		178.2
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	258.6		178.6
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	256.7		181.7
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	256.1		196.1
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	257.5		237.5
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	253.7		233.7
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	259.4		189.4
42	72	76	77	0	40.0	13.339	8.606		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	255.6		235.6
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	243.9		193.9
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.5		210.5
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	241.1		181.1
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.0		222.0
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.7		192.7
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.2		151.2
50	47	88	31	99	60.0	6.153	3.970	KNOWN	264.7		204.7
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	256.0		236.0
52	103	34	91	0	80.0	39.669	25.593		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	259.8		139.8
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.6		136.6
55	104	60	36	0	60.0	4.473	2.886		264.0	KNOWN	204.0
56	74	0	0	0	100.0	2.821	1.820		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	254.1		229.1
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	261.0		186.0
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.3		205.3
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	260.3		220.3
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	259.3		79.3
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	259.6		214.6
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	248.9		148.9
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	247.0		157.0
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.5		154.5
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	256.3		196.3
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	255.9		195.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	1.372	0.885
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	1.726	1.113
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	1.051	0.678
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	0.268	0.173
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.554	1.648
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	15.755	10.164
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.354	0.874
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	2.222	1.433
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	7.657	4.940
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.279	0.180
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	10.766	6.946
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	5.462	3.524
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.214	0.138
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.705	0.455
—58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.117	0.075
6	7	6	36.0	1760.0	135.0	0.0045	KNOWN	8.572	5.530
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.237	0.153
90	13	6	36.0	5000.0	135.0	0.0128	KNOWN	10.299	6.644
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	0.767	0.495
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	0.649	0.419
8	8	7	36.0	2400.0	135.0	0.0062	KNOWN	9.345	6.029
— 7	7	9	36.0	1920.0	135.0	0.0049	KNOWN	0.220	0.142
10	8	18	42.0	1920.0	135.0	0.0023	KNOWN	22.350	14.419
9	10	9	36.0	4700.0	0.0	99.9999	KNOWN	0.002	0.002
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	1.741	1.123
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	12	11	12.0	2600.0	135.0	1.4054	KNOWN	0.796	0.513
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	1.312	0.847
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	27.826	17.952
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	30.141	19.446
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	1.610	1.039
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	0.576	0.372
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.036	1.313
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	2.596	1.675
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	2.589	1.670
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	9.513	6.138
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	21.520	13.884
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	2.390	1.542
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	14.938	9.638
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	0.085	0.055
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.153	0.099
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	2.051	1.323
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	1.998	1.289
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.453	0.937
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	7.688	4.960
—29	23	22	16.0	3050.0	135.0	0.4061	KNOWN	0.929	0.599
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	2.196	1.417
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	5.287	3.411
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	0.247	0.159
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.975	1.919
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	0.730	0.471
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	3.070	1.981
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.143	1.383
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	1.472	0.950
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.132	2.021
54	32	33	30.0	3300.0	135.0	0.0206	KNOWN	0.711	0.459
—55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.272	0.175
-56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	2.505	1.616
—57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.720	0.465
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.448	0.934
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.665	0.429
—62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	6.599	4.258
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.199	0.774
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.516	0.333
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.499	0.322
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	8.385	5.410
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.225	0.145
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.187	0.121
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.306	2.778
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.123	0.724
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.936	1.249
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.532	0.343
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	5.656	3.649
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.360	0.232
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.568	0.367
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	12.135	7.829
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	2.821	1.820
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.845	0.545
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.918	0.592
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.895	1.222
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.992	1.285
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.792	0.511
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.273	0.821
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.401	1.549
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.145	1.384
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.051	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.604	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.369	0.238
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.566	4.236
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.803	5.034
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.465	3.526
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.445	2.223
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.192	0.769
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	7.273	4.692
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.810	1.813
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	3.440	2.220
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.462	0.298
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.331	0.213

TABLE SHS-54
STUDY DAY: 1966 OPERATION
PIPE 50 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	258.6		143.6
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	259.7		199.7
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	259.7		219.7
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	251.8		141.8
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	251.7		111.7
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	260.7		220.7
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	260.9		165.9
8	8	10	0	0	30.0	4.989	3.219		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	262.4		182.4
10	9	103	0	0	100.0	21.861	14.104		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	262.6		212.6
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	263.4		183.4
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	262.5		137.5
14	[illegible]	[illegible]	[illegible]	0	30.0	-1.829	-1.180	KNOWN	252.7		[illegible]
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	[illegible]		236.3
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	257.6		237.6
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	257.7		237.7
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	259.4		219.4
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	256.7		236.7
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	256.7		236.7
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	256.8		236.8
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	255.1		235.1
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	255.8		235.8
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	236.7		216.7
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	236.7		216.7
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	237.0		217.0
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	236.3		216.3
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	250.0		225.0
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	236.7		216.7
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	255.4		235.4
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	251.2		211.2
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	251.9		156.9
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	252.9		142.9
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	253.6		178.6
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	254.5		174.5
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	255.9		175.9
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	254.0		179.0
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	254.3		194.3
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	256.2		236.2
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	251.9		231.9
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	258.4		188.4
42	72	76	77	0	40.0	21.121	13.627		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	253.7		233.7
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	243.6		193.6
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.4		210.4
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	240.9		180.9
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.3		222.3
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.9		192.9
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.4		151.4
50	47	88	31	99	60.0	6.153	3.970	KNOWN	265.0		205.0
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	256.4		236.4
52	103	34	91	0	80.0	33.364	21.525		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	260.0		140.0
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.8		136.8
55	104	60	36	0	60.0	5.104	3.293		264.0	KNOWN	204.0
56	74	0	0	0	100.0	3.304	2.132		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	252.2		227.2
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	262.8		187.8
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.5		205.5
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	262.1		222.1
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	259.7		79.7
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	261.2		216.2
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	247.8		147.8
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	246.5		156.5
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.7		154.7
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	253.9		193.9
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	253.9		193.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	1.483	0.957
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	2.114	1.364
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	1.551	1.001
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	0.497	0.321
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.895	1.867
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	18.030	11.632
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.875	1.210
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	2.658	1.715
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	9.204	5.938
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.147	0.095
50	13	4	36.0	3400.0	0.0	99.9999	KNOWN	0.003	0.002
—52	32	4	36.0	1600.0	135.0	0.0041	KNOWN	5.062	3.266
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.321	0.207
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.524	0.338
-58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.429	0.277
6	7	6	36.0	1760.0	135.0	0.0045	KNOWN	7.742	4.995
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.697	0.450
90	13	6	36.0	5000.0	135.0	0.0128	KNOWN	14.597	9.418
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	2.586	1.668
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	1.155	0.745
—8	7	8	36.0	2400.0	135.0	0.0062	KNOWN	14.311	9.233
7	9	7	36.0	1920.0	135.0	0.0049	KNOWN	22.502	14.518
10	8	18	42.0	1920.0	135.0	0.0023	KNOWN	19.300	12.452
9	10	9	36.0	4700.0	135.0	0.0121	KNOWN	24.116	15.559
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	0.912	0.589
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	12	11	12.0	2600.0	135.0	1.4054	KNOWN	0.722	0.466
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	1.386	0.894
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	22.257	14.359
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	24.497	15.805
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	2.116	1.365
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	1.597	1.030
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.472	1.595
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	1.388	0.895
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	2.703	1.744
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	10.175	6.565
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	20.289	13.090
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	2.374	1.531
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	14.931	9.633
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	1.904	1.228
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.092	0.059
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	2.096	1.352
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	2.051	1.323
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.699	1.096
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	8.105	5.229
—29	23	22	16.0	3050.0	135.0	0.4061	KNOWN	1.323	0.854
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	2.836	1.830
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	5.309	3.425
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	0.134	0.086
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.862	1.846
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	0.843	0.544
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	3.183	2.054
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	1.390	0.897
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	1.563	1.008
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	1.359	0.877
—54	33	32	30.0	3300.0	135.0	0.0206	KNOWN	7.860	5.071
55	34	33	12.0	4800.0	135.0	2.5946	KNOWN	0.502	0.324
-56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	10.303	6.647
—57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	1.181	0.762
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.932	1.246
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.523	0.338
—62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	14.054	9.067
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	0.656	0.423
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.259	0.167
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.516	0.333
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	15.856	10.229
—64	38	37	12.0	2700.0	50.0	9.1666	KNOWN	0.170	0.110
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.055	0.035
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	5.064	3.267
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.124	0.725
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	2.297	1.482
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.559	0.360
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	6.343	4.092
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.457	0.295
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.465	0.300
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	19.812	12.782
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	3.304	2.132
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.852	0.550
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.890	0.574
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.866	1.204
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.019	1.302
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.780	0.504
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.227	0.792
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.413	1.556
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.184	1.409
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.052	0.679
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.606	0.391
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.372	0.240
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.601	4.259
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.839	5.058
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.914	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.501	3.549
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.538	2.283
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.246	0.804
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	6.612	4.266
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.852	1.840
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	2.686	1.733
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.374	0.242
101	67	66	12.0	1400.0	60.0	3.3922	KNOWN	0.058	0.037

TABLE SHS-55
STUDY DAY: 1966 OPERATION
PIPE 33 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVENT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	258.3		143.3
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	259.2		199.2
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	259.1		219.1
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	259.5		149.5
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	258.8		118.8
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	260.0		220.0
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	260.4		165.4
8	8	10	0	0	30.0	10.876	7.017		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	262.1		182.1
10	9	103	0	0	100.0	22.818	14.721		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	261.9		211.9
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	262.0		182.0
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	260.6		135.6
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	256.6		226.6
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	257.9		237.9
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	257.3		237.3
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	257.4		237.4
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	259.3		219.3
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	256.4		236.4
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	256.4		236.4
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	256.5		236.5
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	255.7		235.7
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	255.5		235.5
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	187.1		167.1
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	189.7		169.7
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	194.3		174.3
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	193.6		173.6
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	255.7		230.7
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	194.0		174.0
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	254.6		234.6
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	256.6		216.6
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	259.3		164.3
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	259.1		149.1
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	258.8		183.8
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	259.1		179.1
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	259.2		179.2
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	257.4		182.4
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	256.5		196.5
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	257.8		237.8
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	254.0		234.0
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	259.6		189.6
42	72	76	77	0	40.0	10.609	6.845		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	256.0		236.0
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	244.0		194.0
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.7		210.7
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	241.2		181.2
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.2		222.2
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.9		192.9
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.4		151.4
50	47	88	31	99	60.0	6.153	3.970	KNOWN	264.9		204.9
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	256.0		236.0
52	103	34	91	0	80.0	38.445	24.803		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	260.0		140.0
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.9		136.9
55	104	60	36	0	60.0	4.309	2.780		264.0	KNOWN	204.0
56	74	0	0	0	100.0	2.688	1.734		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	254.4		229.4
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	262.3		187.3
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.5		205.5
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	261.4		221.4
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	259.4		79.4
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	260.0		215.0
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	249.3		149.3
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	247.2		157.2
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.7		154.7
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	256.9		196.9
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	256.3		196.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	1.274	0.822
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	1.572	1.014
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	0.801	0.517
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	0.460	0.297
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.648	1.708
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	16.500	10.645
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.088	0.702
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	2.486	1.604
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	8.596	5.546
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.334	0.215
50	13	4	36.0	3400.0	135.0	0.0087	KNOWN	13.370	8.626
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	7.985	5.151
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.187	0.121
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.794	0.513
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.027	0.017
6	7	6	36.0	1760.0	135.0	0.0045	KNOWN	12.487	8.056
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.770	0.497
90	13	6	36.0	5000.0	135.0	0.0128	KNOWN	8.044	5.190
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.844	1.190
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	0.369	0.238
8	7	8	36.0	2400.0	135.0	0.0062	KNOWN	10.135	6.539
7	9	7	36.0	1920.0	135.0	0.0049	KNOWN	23.072	14.885
10	8	10	42.0	1920.0	135.0	0.0023	KNOWN	21.010	13.555
9	10	9	36.0	4700.0	135.0	0.0121	KNOWN	25.073	16.176
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	0.599	0.386
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	12	11	12.0	2600.0	135.0	1.4054	KNOWN	0.156	0.101
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	1.952	1.259
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	27.749	17.902
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	29.419	18.980
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	1.330	0.858
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	0.017	0.011
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.300	1.484
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	1.980	1.277
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	2.712	1.750
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	9.978	6.437
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	21.258	13.715
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	2.429	1.567
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	15.253	9.841
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	1.162	0.750
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.113	0.073
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	2.130	1.374
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	2.081	1.343
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.145	0.739
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	8.460	5.458
29	22	23	16.0	3050.0	135.0	0.4061	KNOWN	0.797	0.514
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	0.161	0.104
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	7.784	5.022
35	25	24	16.0	3050.0	135.0	0.4061	KNOWN	2.727	1.759
33	28	24	16.0	4800.0	0.0	99.9999	KNOWN	0.001	0.001
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	3.704	2.389
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	6.044	3.899
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	1.202	0.776
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	1.949	1.257
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	2.708	1.747
54	32	33	30.0	3300.0	135.0	0.0206	KNOWN	3.568	2.302
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.317	0.205
56	33	35	30.0	3400.0	135.0	0.0212	KNOWN	0.292	0.188
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.674	0.435
60	55	34	16.0	3680.0	50.0	3.0770	KNOWN	1.328	0.857
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.688	0.444
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	3.850	2.484
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.284	0.829
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.559	0.360
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.495	0.320
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	5.655	3.649
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.282	0.182
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.211	0.136
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.187	2.702
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.123	0.724
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.874	1.209
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.528	0.340
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	5.556	3.585
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.336	0.217
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.573	0.370
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	9.435	6.087
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	2.688	1.734
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.840	0.542
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.923	0.595
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.899	1.225
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.994	1.287
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.791	0.511
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.275	0.822
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.402	1.549
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.148	1.386
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.051	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.604	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.369	0.238
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.569	4.238
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.806	5.036
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.468	3.528
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.444	2.222
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.187	0.766
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	6.770	4.367
87	65	54	20.0	10000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.794	1.802
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	2.938	1.896
98	63	64	12.0	2400.0	50.0	0.1481	KNOWN	0.480	0.310
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.398	0.257

TABLE SHS-56
STUDY DAY: 1966 OPERATION
PIPE 42 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVENT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	257.8		142.8
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	259.1		199.1
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	259.1		219.1
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	259.3		149.3
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	258.6		118.6
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	259.9		219.9
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	260.4		165.4
8	8	10	0	0	30.0	9.883	6.376		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	262.1		182.1
10	9	103	0	0	100.0	22.862	14.750		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	261.9		211.9
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	261.9		181.9
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	260.5		135.5
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	253.8		223.8
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	258.1		238.1
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	257.6		237.6
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	257.7		237.7
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	259.4		219.4
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	256.8		236.8
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	256.8		236.8
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	257.0		237.0
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	254.9		234.9
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	256.4		236.4
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	228.3		208.3
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	224.6		204.6
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	222.6		202.6
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	221.9		201.9
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	246.2		221.2
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	222.3		202.3
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	256.2		236.2
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	253.1		213.1
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	259.1		164.1
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	258.9		148.9
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	258.6		183.6
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	258.9		178.9
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	259.1		179.1
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	257.3		182.3
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	256.4		196.4
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	257.8		237.8
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	253.9		233.9
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	259.6		189.6
42	72	76	77	0	40.0	11.243	7.253		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	255.9		235.9
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	244.0		194.0
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.7		210.7
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	241.2		181.2
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.2		222.2
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.9		192.9
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.4		151.4
50	47	88	31	99	60.0	6.153	3.970	KNOWN	264.9		204.9
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	256.5		236.5
52	103	34	91	0	80.0	38.699	24.967		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	260.0		140.0
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.8		136.8
55	104	60	36	0	60.0	4.341	2.801		264.0	KNOWN	204.0
56	74	0	0	0	100.0	2.716	1.752		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	254.4		229.4
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	262.3		187.3
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.5		205.5
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	261.3		221.3
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	259.5		79.5
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	260.0		215.0
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	249.2		149.2
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	247.2		157.2
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.7		154.7
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	256.8		196.8
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	256.2		196.2

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	1.603	1.034
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	1.708	1.102
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	1.266	0.817
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	0.124	0.080
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.652	1.711
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	16.273	10.499
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.621	1.046
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	2.245	1.449
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	7.742	4.995
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.330	0.213
50	13	4	36.0	3400.0	135.0	0.0087	KNOWN	14.112	9.104
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	8.734	5.635
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.192	0.124
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.754	0.486
58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.016	0.011
6	7	6	36.0	1760.0	135.0	0.0045	KNOWN	12.709	8.199
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.774	0.499
90	13	6	36.0	5000.0	135.0	0.0128	KNOWN	7.526	4.855
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.691	1.091
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	0.303	0.195
8	7	8	36.0	2400.0	135.0	0.0062	KNOWN	9.945	6.416
7	9	7	36.0	1920.0	135.0	0.0049	KNOWN	23.083	14.893
10	8	10	42.0	1920.0	135.0	0.0023	KNOWN	19.817	12.785
9	10	9	36.0	4700.0	135.0	0.0121	KNOWN	25.113	16.202
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	0.561	0.362
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	12	11	12.0	2600.0	135.0	1.4054	KNOWN	0.107	0.069
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	2.001	1.291
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	28.032	18.085
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	29.658	19.134
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	1.263	0.815
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	1.055	0.681
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.060	1.329
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	1.697	1.095
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	2.572	1.659
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	8.742	5.640
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	19.913	12.847
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	2.287	1.475
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	14.333	9.247
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	1.010	0.651
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.113	0.073
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	1.987	1.282
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	1.941	1.253
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.938	1.250
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	6.433	4.150
29	23	22	16.0	3050.0	135.0	0.4061	KNOWN	2.017	1.302
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	3.769	2.432
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	2.871	1.852
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	3.316	2.140
33	28	24	16.0	4800.0	135.0	0.6392	KNOWN	6.044	3.899
37	25	26	16.0	3050.0	135.0	0.4061	KNOWN	2.331	1.504
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	0.0	99.9999	KNOWN	0.001	0.000
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.639	2.348
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	0.744	0.480
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	4.146	2.675
54	32	33	30.0	3300.0	135.0	0.0206	KNOWN	2.920	1.884
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.320	0.206
56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	0.345	0.222
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.685	0.442
60	55	34	16.0	3680.0	50.0	3.0770	KNOWN	1.354	0.873
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.683	0.441
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	4.506	2.907
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.268	0.818
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.550	0.355
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.496	0.320
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	6.289	4.057
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.271	0.175
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.206	0.133
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.210	2.716
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.123	0.724
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.886	1.217
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.528	0.341
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	5.575	3.597
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.341	0.220
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.572	0.369
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	10.062	6.491
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	2.717	1.753
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.840	0.542
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.922	0.595
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.898	1.225
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.995	1.287
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.791	0.510
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.274	0.822
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.402	1.550
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.149	1.386
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.051	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.604	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.369	0.238
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.569	4.238
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.807	5.037
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.914	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.469	3.528
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.446	2.223
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.189	0.767
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	6.784	4.377
87	65	54	20.0	10000.0	130.0	0.7707	KNOWN	2.030	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.796	1.804
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	2.953	1.905
98	63	64	12.0	2400.0	50.0	0.1481	KNOWN	0.477	0.308
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.385	0.248

TABLE SHS-57
STUDY DAY: 1966 OPERATION
NODE 8 = 0.0 MGD

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	256.2		141.2
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	256.9		196.9
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	256.9		216.9
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	258.4		148.4
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	257.8		117.8
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	257.8		217.8
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	258.1		163.1
8	8	10	0	0	30.0	0.000	0.000	KNOWN	256.8		226.8
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	260.5		180.5
10	9	103	0	0	100.0	27.199	17.547		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	260.8		210.8
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	260.9		180.9
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	259.2		134.2
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	253.8		223.8
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	255.4		235.4
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	254.8		234.8
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	254.8		234.8
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	256.4		216.4
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	253.8		233.8
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	253.8		233.8
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	254.1		234.1
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	253.0		233.0
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	253.2		233.2
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	246.6		226.6
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	246.5		226.5
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	246.9		226.9
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	246.2		226.2
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	250.8		225.8
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	246.6		226.6
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	252.7		232.7
31	46	48	49	0	40.0	-1.568	-1.010	KNOWN	253.8		213.8
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	258.3		163.3
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	258.2		148.2
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	258.0		183.0
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	258.3		178.3
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	258.7		178.7
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	256.8		181.8
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	256.2		196.2
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	257.6		237.6
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	253.7		233.7
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	259.4		189.4
42	72	76	77	0	40.0	13.087	8.443		260.8	KNOWN	220.8
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	255.7		235.7
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	243.9		193.9
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.5		210.5
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	241.1		181.1
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.0		222.0
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.7		192.7
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.2		151.2
50	47	88	31	99	60.0	6.153	3.970	KNOWN	264.7		204.7
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	253.5		233.5
52	103	34	91	0	80.0	42.195	27.223		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	259.8		139.8
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.7		136.7
55	104	60	36	0	60.0	4.456	2.875		264.0	KNOWN	204.0
56	74	0	0	0	100.0	2.808	1.812		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	254.1		229.1
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	261.1		186.1
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.3		205.3
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	260.2		220.2
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	256.6		76.6
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	258.2		213.2
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	249.0		149.0
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	247.0		157.0
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.5		154.5
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	256.4		196.4
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	255.9		195.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	1.181	0.762
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	1.819	1.174
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	0.954	0.616
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	0.667	0.431
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.763	1.783
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	17.452	11.260
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.205	0.777
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	2.716	1.752
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	9.409	6.071
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.286	0.185
50	13	4	36.0	3400.0	135.0	0.0087	KNOWN	11.472	7.402
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	6.158	3.973
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.211	0.136
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.707	0.456
-58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.107	0.069
6	7	6	36.0	1760.0	135.0	0.0045	KNOWN	9.619	6.206
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.865	0.558
90	13	6	36.0	5000.0	135.0	0.0128	KNOWN	12.368	7.979
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	2.850	1.839
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	0.895	0.578
-8	7	8	36.0	2400.0	135.0	0.0062	KNOWN	17.843	11.512
7	9	7	36.0	1920.0	135.0	0.0049	KNOWN	27.911	18.007
10	8	18	42.0	1920.0	135.0	0.0023	KNOWN	17.843	11.512
9	10	9	36.0	4700.0	135.0	0.0121	KNOWN	29.454	19.002
-12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	1.152	0.743
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	12	11	12.0	2600.0	135.0	1.4054	KNOWN	0.248	0.160
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	1.860	1.200
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	30.941	19.962
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	32.709	21.102
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	1.856	1.198
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	0.331	0.213
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.530	1.632
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	0.373	0.241
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	2.724	1.757
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	9.403	6.066
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	19.096	12.320
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	2.345	1.513
23	17	51	42.0	7200.0	135.0	0.0087	KNOWN	14.782	9.537
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	2.168	1.399
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.068	0.044
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	2.090	1.349
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	2.048	1.321
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.342	0.866
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	7.689	4.968
29	23	22	16.0	3050.0	135.0	0.4061	KNOWN	0.649	0.419
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	1.807	1.166
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	5.567	3.591
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	0.280	0.181
33	28	24	16.0	4800.0	135.0	0.6392	KNOWN	2.757	1.779
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	0.945	0.610
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	135.0	0.6392	KNOWN	3.286	2.120
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.321	1.498
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	1.405	0.906
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.556	2.294
54	32	33	30.0	3300.0	135.0	0.0206	KNOWN	0.982	0.633
-55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.282	0.182
-56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	2.245	1.449
-57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.716	0.462
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.436	0.927
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.668	0.431
-62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	6.349	4.096
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.209	0.780
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.520	0.336
63	36	37	12.0	2000.0	50.0	6.7981	KNOWN	0.499	0.322
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	8.134	5.248
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.232	0.149
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.190	0.122
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.293	2.769
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.123	0.724
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.929	1.245
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.532	0.343
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	5.645	3.642
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.358	0.231
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.569	0.367
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	11.888	7.668
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	2.808	1.812
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.844	0.545
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.919	0.593
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.895	1.223
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.992	1.285
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.792	0.511
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.273	0.821
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.401	1.549
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.145	1.384
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.051	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.604	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.369	0.238
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.566	4.236
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.803	5.034
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.465	3.526
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.445	2.223
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.191	0.769
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	7.231	4.665
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.809	1.812
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	3.399	2.193
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.464	0.299
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.338	0.218

TABLE SHS-58
1972 MDC HEADS
NOTHING CLEANED & LINED
NODE 8 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	242.8		127.8
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	244.3		184.3
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	242.9		202.9
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	252.1		142.1
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	251.3		111.3
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	245.7		205.7
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	245.8		150.8
8	8	10	0	0	30.0	0.000	0.000	KNOWN	242.6		212.6
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	250.8		170.8
10	9	103	0	0	100.0	20.873	13.466		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	249.6		199.6
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	257.7		177.7
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	255.1		130.1
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	238.3		208.3
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	237.0		217.0
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	236.2		216.2
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	236.2		216.2
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	241.3		201.3
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	232.8		212.8
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	232.8		212.8
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	232.1		212.1
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	230.3		210.3
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	228.0		208.0
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	212.1		192.1
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	211.6		191.6
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	211.8		191.8
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	210.3		190.3
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	229.6		204.6
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	211.2		191.2
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	225.6		205.6
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	238.9		198.9
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	251.6		156.6
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	251.6		141.6
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	251.8		176.8
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	252.2		172.2
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	254.0		174.0
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	249.1		174.1
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	243.1		183.1
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	248.8		228.8
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	240.1		220.1
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	257.6		187.6
42	72	76	77	0	40.0	14.778	9.534		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	242.4		222.4
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	239.3		189.3
45	78	80	82	0	40.0	2.247	1.450	KNOWN	244.8		204.8
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	235.9		175.9
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	254.1		214.1
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	254.7		184.7
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	253.3		143.3
50	47	88	31	99	60.0	6.153	3.970	KNOWN	256.6		196.6
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	231.8		211.8
52	103	34	91	0	80.0	46.928	30.276		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	251.9		131.9
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	248.9		128.9
55	104	60	36	0	60.0	5.247	3.385		264.0	KNOWN	204.0
56	74	0	0	0	100.0	1.918	1.237		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	240.2		215.2
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	250.8		175.8
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	259.9		199.9
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	245.4		205.4
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	243.5		63.5
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	248.3		203.3
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	243.9		143.9
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	243.1		153.1
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	251.8		146.8
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	246.6		186.6
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	242.9		182.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	0.701	0.452
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	2.043	1.318
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.698	0.450
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	2.048	1.321
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.664	2.364
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	14.211	9.169
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.724	0.467
18	3	15	20.0	5120.0	70.0	0.7751	KNOWN	2.989	1.928
19	3	16	30.0	5400.0	60.0	0.1509	KNOWN	7.757	5.005
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.360	0.232
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	12.961	8.362
52	4	32	36.0	1600.0	70.0	0.0138	KNOWN	7.371	4.755
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.003	0.002
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.544	0.351
-58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.196	0.127
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	2.052	1.324
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.226	0.791
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	18.272	11.788
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	3.968	2.560
89	62	6	16.0	3200.0	50.0	2.6763	KNOWN	0.976	0.630
-8	7	8	36.0	2400.0	75.0	0.0183	KNOWN	16.163	10.428
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	18.666	12.043
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	16.163	10.428
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	21.625	13.952
-12	58	9	16.0	3700.0	45.0	3.7605	KNOWN	0.095	0.061
103	52	10	24.0	2400.0	45.0	0.3586	KNOWN	0.753	0.486
14	12	11	12.0	2600.0	45.0	10.7268	KNOWN	0.859	0.554
93	58	11	16.0	800.0	45.0	0.8131	KNOWN	1.249	0.806
13	11	60	16.0	4400.0	45.0	4.4720	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	38.637	24.927
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	41.017	26.462
94	13	62	16.0	2400.0	50.0	2.0073	KNOWN	1.937	1.250
-46	31	14	16.0	5000.0	60.0	2.9845	KNOWN	0.407	0.263
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.803	1.808
-21	16	17	24.0	1200.0	50.0	0.1393	KNOWN	0.323	0.209
26	16	20	20.0	3400.0	70.0	0.5147	KNOWN	2.755	1.778
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	7.298	4.708
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	18.535	11.958
24	17	19	20.0	4500.0	70.0	0.6013	KNOWN	2.361	1.523
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	14.899	9.612
92	61	18	20.0	1440.0	65.0	0.2500	KNOWN	3.286	2.120
25	19	20	16.0	1000.0	70.0	0.4488	KNOWN	0.058	0.037
45	19	51	20.0	1700.0	70.0	0.2574	KNOWN	2.114	1.364
41	20	51	20.0	1760.0	70.0	0.2665	KNOWN	2.072	1.337
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.751	1.130
28	21	23	30.0	3300.0	40.0	0.1953	KNOWN	5.175	3.339
29	22	23	16.0	3050.0	60.0	1.8206	KNOWN	1.142	0.737
32	22	28	16.0	5600.0	60.0	3.3427	KNOWN	0.423	0.273
44	23	30	30.0	3200.0	50.0	0.1253	KNOWN	4.845	3.126
35	24	25	16.0	3050.0	70.0	1.3689	KNOWN	0.591	0.382
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.319	2.142
37	26	25	16.0	3050.0	70.0	1.3689	KNOWN	0.385	0.248
38	26	27	16.0	3300.0	70.0	1.4811	KNOWN	1.029	0.664
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.924	0.596
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.726	1.758
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.722	0.466
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	4.261	2.749
43	51	30	16.0	3200.0	50.0	2.6765	KNOWN	1.570	1.013
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	6.233	4.021
-54	33	32	30.0	3300.0	70.0	0.0694	KNOWN	0.342	0.220
55	34	33	12.0	4800.0	60.0	11.6306	KNOWN	0.106	0.068
-56	35	33	30.0	3400.0	70.0	0.0715	KNOWN	3.164	2.041
-57	35	34	16.0	4800.0	80.0	1.6027	KNOWN	0.474	0.306
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.106	1.359
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.620	0.400
-62	36	35	30.0	1800.0	70.0	0.0378	KNOWN	7.969	5.141
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.753	1.131
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.917	0.592
63	36	37	12.0	2000.0	50.0	6.7961	KNOWN	0.830	0.536
75	41	36	30.0	2400.0	70.0	0.0504	KNOWN	10.084	6.506
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.798	0.515
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.499	0.322
70	39	38	20.0	2080.0	40.0	0.8867	KNOWN	2.731	1.762
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.343	0.867
65	38	67	20.0	1760.0	60.0	0.3544	KNOWN	0.698	0.450
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.822	0.531
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.914	2.525
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.816	0.526
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.275	0.178
76	42	41	36.0	2400.0	70.0	0.0208	KNOWN	12.996	8.385
74	56	41	16.0	3000.0	70.0	1.3464	KNOWN	1.918	1.237
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.967	0.624
67	43	57	12.0	3400.0	50.0	11.5431	KNOWN	0.405	0.262
102	67	43	20.0	1600.0	60.0	0.3222	KNOWN	1.319	0.851
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.800	1.161
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.874	0.564
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.424	0.918
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.319	1.496
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	1.872	1.208
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.047	0.676
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.589	0.380
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.349	0.225
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.312	4.073
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.545	4.868
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.914	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.212	3.363
31	59	50	24.0	3000.0	45.0	0.4233	KNOWN	3.041	1.962
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.060	0.684
91	52	59	24.0	2400.0	45.0	0.3386	KNOWN	5.159	3.329
87	65	54	20.0	16000.0	130.0	3.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.138	2.025
81	59	58	12.0	800.0	45.0	3.3005	KNOWN	1.731	1.117
98	63	64	12.0	2400.0	50.0	3.1481	KNOWN	0.285	0.184
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.045	0.674

TABLE SHS-59
1972 MDC HEADS
FIRST PHASE CLEANING & LINING

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	255.3		140.3
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	255.7		195.7
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	255.3		215.3
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	257.9		147.9
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	257.4		117.4
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	257.3		217.3
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	259.8		164.8
8	8	10	0	0	30.0	18.270	11.787		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	261.4		181.4
10	9	103	0	0	100.0	9.799	6.322		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	261.5		211.5
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	261.6		181.6
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	260.1		135.1
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	251.7		221.7
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	250.6		230.6
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	248.2		228.2
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	247.3		227.3
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	259.3		219.3
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	245.8		225.8
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	245.8		225.8
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	247.4		227.4
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	246.2		226.2
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	246.2		226.2
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	229.7		209.7
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	229.6		209.6
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	229.8		209.8
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	229.0		209.0
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	245.3		220.3
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	229.4		209.4
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	245.4		225.4
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	251.4		211.4
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	257.8		162.8
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	257.8		147.8
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	257.6		182.6
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	258.0		178.0
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	258.4		178.4
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	256.5		181.5
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	256.0		196.0
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	257.4		237.4
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	253.5		233.5
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	259.3		189.3
42	72	76	77	0	40.0	14.083	9.086		260.0	KNOWN	220.0
43	57	102	0	0	20.0	-0.976	-0.630	KNOWN	255.5		235.5
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	243.9		193.9
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.6		210.6
46	79	80	3	0	60.0	-3.193	-2.060	KNOWN	241.1		181.1
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.1		222.1
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.8		192.8
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.3		151.3
50	47	88	31	99	60.0	6.153	3.970	KNOWN	264.8		204.8
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	245.1		225.1
52	103	34	91	0	80.0	39.835	25.700		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	259.9		139.9
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.8		136.8
55	104	69	36	0	60.0	4.517	2.914		264.0	KNOWN	204.0
56	74	0	0	0	100.0	2.861	1.846		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	254.0		229.0
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	261.8		186.8
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.4		205.4
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	260.9		220.9
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	258.6		78.6
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	258.3		213.3
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	248.9		148.9
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	247.0		157.0
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.6		154.6
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	256.1		196.1
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	255.8		195.8

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	0.868	0.560
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	2.367	1.527
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	1.189	0.767
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	2.109	1.361
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	3.891	2.511
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	26.996	17.417
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.309	0.844
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	5.110	3.297
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	17.897	11.546
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.277	0.179
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	11.083	7.150
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	5.789	3.735
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.221	0.143
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.688	0.444
58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.136	0.088
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	16.593	10.705
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	1.085	0.700
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	9.408	6.070
30	61	6	24.0	2400.0	65.0	0.1715	KNOWN	2.921	1.885
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	1.562	1.007
8	6	7	36.0	2400.0	135.0	0.0062	KNOWN	6.866	4.430
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	10.055	6.487
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	11.379	7.342
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	12.054	7.777
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	0.915	0.590
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	12	11	12.0	2600.0	135.0	1.4054	KNOWN	0.273	0.176
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	1.835	1.184
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	28.806	18.584
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	30.598	19.740
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	2.523	1.627
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	0.668	0.431
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	4.924	3.177
21	16	17	24.0	1200.0	135.0	0.0222	KNOWN	7.624	4.919
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	4.453	2.873
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	10.557	6.811
22	18	17	20.0	7000.0	135.0	0.3144	KNOWN	7.146	4.610
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	2.957	1.907
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	10.217	6.591
92	18	61	20.0	1440.0	135.0	0.0647	KNOWN	3.603	2.325
25	20	19	16.0	1000.0	135.0	0.1332	KNOWN	0.459	0.296
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	3.230	2.084
41	21	51	20.0	1760.0	135.0	0.0791	KNOWN	3.250	2.097
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.386	0.894
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	8.799	5.677
29	22	23	16.0	3050.0	135.0	0.4061	KNOWN	0.099	0.064
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	1.101	0.710
44	23	30	30.0	5200.0	135.0	0.0200	KNOWN	7.426	4.791
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	0.399	0.257
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.127	2.017
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	0.578	0.373
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.918	1.883
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	3.390	2.187
43	30	51	16.0	3200.0	135.0	0.4261	KNOWN	0.819	0.528
49	32	31	27.0	5120.0	75.0	0.4289	KNOWN	4.287	2.766
54	33	32	30.0	3300.0	135.0	0.0206	KNOWN	0.101	0.065
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.229	0.148
56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	3.275	2.113
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.734	0.473
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.486	0.959
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.655	0.422
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	7.337	4.734
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.169	0.754
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.501	0.323
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.501	0.323
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	9.125	5.887
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	9.125	5.887
64	37	38	12.0	2700.0	50.0	9.1066	KNOWN	0.205	0.132
66	37	66	12.0	2700.0	50.0	9.1066	KNOWN	0.179	0.115
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.349	2.806
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.123	0.725
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.958	1.263
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.535	0.345
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	5.693	3.673
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.367	0.237
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.571	0.369
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	12.872	8.304
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	2.861	1.846
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.844	0.544
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.917	0.592
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.894	1.222
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.997	1.288
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.791	0.510
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.267	0.818
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.403	1.550
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.152	1.388
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.052	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.605	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.370	0.238
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.572	4.240
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.809	5.038
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.914	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.471	3.530
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.458	2.231
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.198	0.773
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	6.983	4.505
87	65	54	20.0	16000.0	130.0	0.7787	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.809	1.813
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	3.137	2.024
98	63	64	12.0	2400.0	50.0	5.1481	KNOWN	0.457	0.295
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.308	0.198

TABLE SHS-60
1972 MDC HEADS
FIRST PHASE CLEANING & LINING
PIPE 23 OUT OF SERVICE

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	CONSUMPTION CFS	CONSUMPTION MGD	STATUS CONS	TOT HEAD FT	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	257.0		142.0
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	257.7		197.7
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	257.6		217.6
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	258.3		148.3
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	257.8		117.8
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	258.6		218.6
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	260.0		165.0
8	8	10	0	0	30.0	20.972	13.530		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	261.6		181.6
10	9	103	0	0	100.0	9.577	6.179		266.8	KNOWN	166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	261.7		211.7
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	262.0		182.0
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	260.7		135.7
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	253.9		223.9
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	256.1		236.1
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	255.4		235.4
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	256.8		236.8
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	258.3		218.3
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	248.8		228.8
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	248.8		228.8
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	253.9		233.9
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	251.9		231.9
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	251.9		231.9
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	234.4		214.4
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	234.3		214.3
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	234.5		214.5
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	233.7		213.7
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	249.7		224.7
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	234.1		214.1
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	250.4		230.4
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	253.6		213.6
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	258.2		163.2
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	258.2		148.2
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	258.0		183.0
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	258.3		178.3
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	258.6		178.6
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	256.8		181.8
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	256.2		196.2
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	257.6		237.6
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	253.7		233.7
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	259.4		189.4
42	72	76	77	0	40.0	13.175	8.500		260.0	KNOWN	220.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	255.7		235.7
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	243.9		193.9
45	78	80	82	0	40.0	2.247	1.450	KNOWN	250.6		210.6
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	241.2		181.2
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.2		222.2
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.9		192.9
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.3		151.3
50	47	88	31	99	60.0	6.153	3.970	KNOWN	264.9		204.9
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	246.0		226.0
52	103	34	91	0	80.0	38.365	24.752		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	259.9		139.9
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.8		136.8
55	104	68	36	0	60.0	4.457	2.875		264.0	KNOWN	204.0
56	74	0	0	0	100.0	2.613	1.615		262.1	KNOWN	162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	254.1		229.1
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	262.0		187.0
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.4		205.4
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	261.2		221.2
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	258.3		78.3
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	259.3		214.3
63	59	99	94	0	100.0	-1.395	-0.900	KNOWN	249.8		149.8
64	97	36	94	0	90.0	-1.999	-1.290	KNOWN	247.1		157.1
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.7		154.7
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	256.4		196.4
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	255.9		195.9

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	DISCHARGE CFS	DISCHARGE MGD
1	2	1	16.0	4000.0	135.0	0.5326	KNOWN	1.115	0.719
16	13	1	12.0	1800.0	135.0	0.9730	KNOWN	2.042	1.317
17	1	14	12.0	4800.0	135.0	2.5946	KNOWN	1.111	0.717
3	2	3	16.0	800.0	135.0	0.1065	KNOWN	0.773	0.499
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	2.803	1.808
5	6	3	36.0	1800.0	135.0	0.0046	KNOWN	17.850	11.516
2	3	14	12.0	4000.0	135.0	2.1621	KNOWN	1.344	0.867
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	2.796	1.804
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	9.694	6.254
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.285	0.184
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	11.420	7.368
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	6.108	3.941
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.212	0.137
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.704	0.454
58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.111	0.071
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	12.268	7.915
11	9	6	16.0	3400.0	45.0	3.4556	KNOWN	0.923	0.595
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	8.149	5.257
30	6	61	24.0	2400.0	65.0	0.1715	KNOWN	1.288	0.831
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	1.283	0.828
8	6	7	36.0	2400.0	135.0	0.0062	KNOWN	2.540	1.639
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	10.054	6.486
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	18.407	11.875
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	11.833	7.634
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	0.973	0.628
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.255	1.455
14	12	11	12.0	2600.0	135.0	1.4054	KNOWN	0.424	0.273
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	1.684	1.087
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	27.281	17.600
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	29.223	18.854
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	2.244	1.448
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	0.626	0.404
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.610	1.684
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	9.508	6.134
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	7.607	4.908
27	16	21	30.0	1760.0	135.0	0.0110	KNOWN	14.019	9.045
22	18	17	44.0	7000.0	135.0	0.0068	KNOWN	18.386	11.862
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	7.278	4.695
23	17	51	42.0	7200.0	0.0	99.9999	KNOWN	0.004	0.002
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	0.606	0.391
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.049	0.032
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	7.043	4.544
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	6.912	4.459
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.865	1.203
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	11.782	7.601
29	23	22	16.0	3050.0	135.0	0.4061	KNOWN	0.113	0.073
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	1.791	1.156
44	23	30	30.0	5200.0	135.0	0.0200	KNOWN	10.197	6.579
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	0.366	0.236
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.094	1.996
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	0.611	0.394
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.951	1.904
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.666	1.720
43	30	51	16.0	3200.0	135.0	0.4261	KNOWN	3.557	2.295
49	32	31	27.0	5120.0	75.0	0.4289	KNOWN	3.606	2.326
54	32	33	30.0	3300.0	135.0	0.0206	KNOWN	0.883	0.570
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.278	0.179
56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	2.340	1.509
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.716	0.462
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.440	0.929
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.664	0.429
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	6.438	4.154
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.205	0.778
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.519	0.335
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.499	0.322
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	8.224	5.306
64	37	38	12.0	2700.0	50.0	9.1066	KNOWN	0.229	0.148
66	37	66	12.0	2700.0	50.0	9.1066	KNOWN	0.189	0.122
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	4.297	2.772
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.123	0.724
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.931	1.246
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.532	0.343
73	41	39	24.0	4000.0	135.0	0.0739	KNOWN	5.649	3.644
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.358	0.231
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.569	0.367
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	11.974	7.725
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	2.813	1.815
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.842	0.543
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.918	0.593
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.895	1.223
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.996	1.288
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.791	0.510
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.269	0.819
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.402	1.550
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.151	1.388
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.052	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.604	0.390
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.369	0.238
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.571	4.239
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.809	5.038
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.915	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.471	3.529
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.455	2.229
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.195	0.771
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	6.887	4.443
87	65	54	20.0	16000.0	130.0	0.7787	KNOWN	2.030	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.804	1.809
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	3.045	1.964
98	63	64	12.0	2400.0	50.0	5.1481	KNOWN	0.464	0.300
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.336	0.216

TABLE SHS-61
1966 CONSUMPTION 1972 HEADS
PARTIALLY CLEANED & LINED

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	253.8		138.8
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	257.0		197.0
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	255.5		215.5
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	259.2		149.2
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	258.7		118.7
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	258.9		218.9
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	260.0		165.0
8	8	10	0	0	30.0	19.637	12.669		260.0	KNOWN	230.0
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	261.3		181.3
10	9	103	0	0	100.0	9.889	6.380	KNOWN	266.8		166.8
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	261.8		211.8
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	262.4		182.4
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	261.1		136.1
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	250.6		220.6
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	254.1		234.1
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	253.4		233.4
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	253.4		233.4
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	258.4		218.4
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	251.0		231.0
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	251.0		231.0
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	248.7		228.7
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	248.0		228.0
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	248.1		228.1
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	231.3		211.3
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	231.3		211.3
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	231.5		211.5
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	230.7		210.7
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	246.3		221.3
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	231.1		211.1
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	247.8		227.8
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	250.8		210.8
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	259.1		164.1
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	259.1		149.1
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	259.0		184.0
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	259.5		179.5
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	260.4		180.4
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	256.6		181.6
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	251.5		191.5
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	252.3		232.3
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	249.0		229.0
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	261.9		191.9
42	72	76	77	0	40.0	18.226	11.759		263.0	KNOWN	223.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	251.1		231.1
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	244.5		194.5
45	78	80	82	0	40.0	2.247	1.450	KNOWN	251.0		211.0
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	241.6		181.6
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	262.2		222.2
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	262.9		192.9
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	261.4		151.4
50	47	88	31	99	60.0	6.153	3.970	KNOWN	264.9		204.9
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	250.1		230.1
52	103	34	91	0	80.0	37.285	24.055		267.0	KNOWN	187.0
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	260.0		140.0
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	256.9		136.9
55	104	60	36	0	60.0	4.073	2.628		264.0	KNOWN	204.0
56	74	0	0	0	100.0	0.636	0.410	KNOWN	262.1		162.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	249.4		224.4
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	262.0		187.0
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	265.4		205.4
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	261.2		221.2
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	258.6		78.6
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	259.6		214.6
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	249.5		149.5
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	247.5		157.5
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	259.7		154.7
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	254.5		194.5
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	251.4		191.4

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.081	0.697
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.543	0.996
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.578	0.373
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	2.158	1.392
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	4.156	2.681
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	15.580	10.052
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	0.751	0.484
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	2.731	1.762
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	9.463	6.105
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.267	0.172
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	10.326	6.662
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	4.821	3.110
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.000	0.000
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.685	0.442
58	34	5	12.0	3200.0	55.0	9.1079	KNOWN	0.148	0.096
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	10.744	6.932
11	9	6	16.0	3400.0	135.0	0.4527	KNOWN	2.460	1.587
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	8.416	5.430
30	6	61	24.0	2400.0	135.0	0.0444	KNOWN	2.555	1.649
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	1.342	0.866
8	8	7	36.0	2400.0	135.0	0.0062	KNOWN	2.135	1.377
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	9.066	5.849
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	17.510	11.297
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	12.152	7.840
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	1.203	0.776
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	2.263	1.460
14	12	11	12.0	2600.0	135.0	1.4054	KNOWN	0.629	0.406
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	1.476	0.952
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	26.016	16.785
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	28.164	18.170
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	2.304	1.486
46	31	14	16.0	5000.0	135.0	0.6658	KNOWN	0.500	0.322
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.545	1.642
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	0.369	0.238
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	4.421	2.853
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	7.766	5.010
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	18.467	11.914
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	3.804	2.454
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	12.699	8.193
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	1.876	1.210
25	20	19	16.0	1000.0	135.0	0.1332	KNOWN	0.061	0.040
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	3.681	2.375
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	3.615	2.332
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.121	0.723
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	6.274	4.048
29	23	22	16.0	3050.0	135.0	0.4061	KNOWN	0.601	0.388
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	1.536	0.991
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	4.200	2.710
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	0.326	0.210
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	3.054	1.970
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	0.650	0.420
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	2.991	1.930
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.883	1.860
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	2.479	1.599
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	4.948	3.192
54	33	32	30.0	3300.0	135.0	0.0206	KNOWN	1.679	1.083
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.237	0.153
56	35	33	30.0	3400.0	135.0	0.0212	KNOWN	4.909	3.167
57	35	34	16.0	4800.0	135.0	0.6392	KNOWN	0.953	0.615
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	1.304	0.842
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.687	0.443
62	36	35	30.0	1800.0	135.0	0.0112	KNOWN	10.125	6.532
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.733	1.118
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.873	0.563
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.731	0.471
75	41	36	30.0	2400.0	135.0	0.0150	KNOWN	12.142	7.834
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.726	0.468
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.451	0.291
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	3.224	2.080
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.124	0.725
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.353	0.873
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.493	0.318
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	4.099	2.644
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.796	0.513
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.608	0.392
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	16.520	10.658
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	0.635	0.410
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.910	0.587
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.957	0.617
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.933	1.247
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	1.970	1.271
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.802	0.518
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.239	0.799
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.391	1.542
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.113	1.364
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.051	0.678
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.602	0.389
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.367	0.237
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.536	4.217
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	7.773	5.015
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.914	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.436	3.507
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.400	2.193
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.178	0.760
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	6.858	4.425
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	2.769	1.786
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	3.071	1.981
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.470	0.303
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	0.952	0.614

TABLE SHS-62
STUDY DAY: 1966 OPERATION
PARTIALLY CLEANED & LINED

NODE	CONNECTING PIPE NUMBERS				ELEVATION INVERT FT	- CONSUMPTION - CFS	MGD	STATUS CONS	TOT HEAD FT H2O	STATUS HEAD	PRESSURE HEAD ELEVATION FT
1	1	16	17	0	115.0	-2.046	-1.320	KNOWN	234.9		119.9
2	1	3	4	0	60.0	-0.914	-0.590	KNOWN	239.2		179.2
3	3	5	2	18	40.0	-4.789	-3.090	KNOWN	237.7		197.7
4	51	50	52	104	110.0	-5.239	-3.380	KNOWN	234.3		124.3
5	51	53	58	0	140.0	-1.101	-0.710	KNOWN	232.8		92.8
6	4	5	6	11	40.0	-0.682	-0.440	KNOWN	241.2		201.2
7	6	8	7	0	95.0	-0.450	-0.290	KNOWN	242.5		147.5
8	8	10	0	0	30.0	18.704	12.067		242.5	KNOWN	212.5
9	11	7	9	12	80.0	-1.829	-1.180	KNOWN	244.7		164.7
10	9	103	0	0	100.0	9.889	6.380	KNOWN	252.9		152.9
11	14	93	13	0	50.0	-1.147	-0.740	KNOWN	245.4		195.4
12	14	15	34	0	80.0	-1.519	-0.980	KNOWN	245.4		165.4
13	16	50	90	15	125.0	-3.426	-2.210	KNOWN	243.0		118.0
14	17	2	46	0	30.0	-1.829	-1.180	KNOWN	228.7		198.7
15	18	20	0	0	20.0	-0.186	-0.120	KNOWN	236.2		216.2
16	19	20	21	26	20.0	-0.186	-0.120	KNOWN	235.5		215.5
17	21	22	24	23	20.0	-1.596	-1.030	KNOWN	235.5		215.5
18	10	22	92	0	40.0	-0.914	-0.590	KNOWN	240.8		200.8
19	24	25	45	0	20.0	-0.186	-0.120	KNOWN	233.0		213.0
20	26	25	41	0	20.0	-0.744	-0.480	KNOWN	233.0		213.0
21	27	95	28	0	20.0	-0.372	-0.240	KNOWN	230.3		210.3
22	95	29	32	0	20.0	-0.186	-0.120	KNOWN	229.2		209.2
23	28	29	44	0	20.0	-1.472	-0.950	KNOWN	229.6		209.6
24	35	33	0	0	20.0	-2.728	-1.760	KNOWN	211.9		191.9
25	35	37	0	0	20.0	-0.976	-0.630	KNOWN	211.9		191.9
26	37	38	40	42	20.0	-0.387	-0.250	KNOWN	212.1		192.1
27	38	39	0	0	20.0	-1.752	-1.130	KNOWN	211.4		191.4
28	32	33	48	0	25.0	-1.364	-0.880	KNOWN	226.1		201.1
29	40	39	0	0	20.0	-0.202	-0.130	KNOWN	211.8		191.8
30	44	42	43	0	20.0	-3.689	-2.380	KNOWN	229.4		209.4
31	46	48	49	0	40.0	-1.566	-1.010	KNOWN	228.7		188.7
32	52	53	49	54	95.0	-0.914	-0.590	KNOWN	233.5		138.5
33	54	55	56	0	110.0	-2.945	-1.900	KNOWN	231.6		121.6
34	58	55	57	60	75.0	-1.659	-1.070	KNOWN	231.5		156.5
35	56	57	62	61	80.0	-1.659	-1.070	KNOWN	230.4		150.4
36	62	63	75	0	80.0	-1.286	-0.830	KNOWN	230.1		150.1
37	61	63	64	66	75.0	-1.286	-0.830	KNOWN	226.8		151.8
38	64	70	69	65	60.0	-1.472	-0.950	KNOWN	220.4		160.4
39	70	71	73	72	20.0	-1.178	-0.760	KNOWN	221.1		201.1
40	71	68	0	0	20.0	-1.101	-0.710	KNOWN	217.8		197.8
41	75	73	76	74	70.0	-0.914	-0.590	KNOWN	230.0		160.0
42	72	76	77	0	40.0	1.989	1.283		230.0	KNOWN	190.0
43	67	102	0	0	20.0	-0.976	-0.630	KNOWN	220.0		200.0
44	77	78	79	97	50.0	-3.317	-2.140	KNOWN	226.0		176.0
45	78	80	82	0	40.0	2.247	1.450	KNOWN	233.9		193.9
46	79	80	0	0	60.0	-3.193	-2.060	KNOWN	223.8		163.8
47	96	47	83	0	40.0	-1.286	-0.830	KNOWN	248.1		208.1
48	96	85	88	0	70.0	-0.186	-0.120	KNOWN	248.8		178.8
49	85	86	84	0	110.0	-0.186	-0.120	KNOWN	247.1		137.1
50	47	88	31	99	60.0	6.153	3.970	KNOWN	250.9		190.9
51	23	45	41	43	20.0	-17.515	-11.300	KNOWN	232.1		212.1
52	103	34	91	0	80.0	52.699	33.999		253.9	KNOWN	173.9
53	86	0	0	0	120.0	-0.914	-0.590	KNOWN	245.7		125.7
54	87	0	0	0	120.0	-2.030	-1.310	KNOWN	242.5		122.5
55	104	60	36	0	60.0	5.983	3.860	KNOWN	251.7		191.7
56	74	0	0	0	100.0	0.485	0.313		230.1	KNOWN	130.1
57	69	68	67	0	25.0	-1.472	-0.950	KNOWN	218.3		193.3
58	12	93	81	0	75.0	-0.387	-0.250	KNOWN	245.8		170.8
59	31	91	81	0	60.0	-0.387	-0.250	KNOWN	251.6		191.6
60	13	0	0	0	40.0	-0.961	-0.620	KNOWN	244.8		204.8
61	30	92	0	0	180.0	-0.682	-0.440	KNOWN	241.0		61.0
62	89	94	0	0	45.0	-0.961	-0.620	KNOWN	241.7		196.7
63	59	99	98	0	100.0	-1.395	-0.900	KNOWN	230.3		130.3
64	97	36	98	0	90.0	-1.999	-1.290	KNOWN	229.9		139.9
65	82	83	84	87	105.0	-1.659	-1.070	KNOWN	245.3		140.3
66	100	66	101	0	60.0	-0.372	-0.240	KNOWN	224.3		164.3
67	65	102	101	0	60.0	-0.372	-0.240	KNOWN	220.3		160.3

PIPE	FROM NODE	TO NODE	DIAMETER INCHES	LENGTH FEET	HAZEN (C) COEFFICIENT	RESISTENCE R=F(D,L,C)	STATUS RES	-- DISCHARGE -- CFS	MGD
1	2	1	16.0	4000.0	55.0	2.8046	KNOWN	1.253	0.808
16	13	1	12.0	1800.0	70.0	3.2793	KNOWN	1.622	1.046
17	1	14	12.0	4800.0	70.0	8.7448	KNOWN	0.829	0.535
3	2	3	16.0	800.0	70.0	0.3590	KNOWN	2.172	1.401
4	6	2	24.0	1600.0	60.0	0.1326	KNOWN	4.339	2.799
5	6	3	36.0	1800.0	60.0	0.0207	KNOWN	16.007	10.327
2	3	14	12.0	4000.0	65.0	8.3581	KNOWN	1.036	0.669
18	3	15	20.0	5120.0	135.0	0.2300	KNOWN	2.766	1.785
19	3	16	30.0	5400.0	135.0	0.0337	KNOWN	9.587	6.185
51	4	5	12.0	1900.0	55.0	5.4078	KNOWN	0.503	0.325
50	13	4	36.0	3400.0	75.0	0.0259	KNOWN	23.022	14.853
52	4	32	36.0	1600.0	135.0	0.0041	KNOWN	17.289	11.154
104	55	4	36.0	6400.0	0.0	99.9999	KNOWN	0.000	0.000
53	32	5	16.0	2000.0	75.0	0.7900	KNOWN	0.946	0.610
58	5	34	12.0	3200.0	55.0	9.1079	KNOWN	0.350	0.225
6	7	6	36.0	1760.0	75.0	0.0134	KNOWN	11.871	7.659
11	9	6	16.0	3400.0	135.0	0.4527	KNOWN	3.002	1.937
90	13	6	36.0	5000.0	70.0	0.0432	KNOWN	7.407	4.779
30	6	61	24.0	2400.0	135.0	0.0444	KNOWN	2.368	1.528
89	62	6	16.0	3200.0	135.0	0.4261	KNOWN	1.117	0.721
8	8	7	36.0	2400.0	135.0	0.0062	KNOWN	0.445	0.287
7	9	7	36.0	1920.0	60.0	0.0221	KNOWN	11.875	7.661
10	8	18	42.0	1920.0	70.0	0.0078	KNOWN	18.258	11.779
9	10	9	36.0	4700.0	60.0	0.0541	KNOWN	15.141	9.769
12	58	9	16.0	3700.0	135.0	0.4927	KNOWN	1.565	1.010
103	52	10	24.0	2400.0	135.0	0.0444	KNOWN	5.251	3.388
14	12	11	12.0	2600.0	135.0	1.4054	KNOWN	0.119	0.077
93	58	11	16.0	800.0	135.0	0.1065	KNOWN	2.109	1.361
13	11	60	16.0	4400.0	135.0	0.5859	KNOWN	0.961	0.620
15	12	13	48.0	3200.0	110.0	0.0030	KNOWN	37.556	24.230
34	52	12	48.0	10400.0	110.0	0.0096	KNOWN	39.059	25.199
94	13	62	16.0	2400.0	135.0	0.3196	KNOWN	2.080	1.342
46	14	31	16.0	5000.0	135.0	0.6658	KNOWN	0.173	0.111
20	15	16	20.0	800.0	70.0	0.1211	KNOWN	2.580	1.665
21	17	16	24.0	1200.0	135.0	0.0222	KNOWN	0.685	0.442
26	16	20	20.0	3400.0	135.0	0.1527	KNOWN	4.473	2.886
27	16	21	30.0	1760.0	40.0	0.1042	KNOWN	8.226	5.307
22	18	17	44.0	7000.0	70.0	0.0228	KNOWN	19.029	12.277
24	17	19	20.0	4500.0	135.0	0.2021	KNOWN	3.851	2.484
23	17	51	42.0	7200.0	70.0	0.0294	KNOWN	12.864	8.299
92	61	18	20.0	1440.0	135.0	0.0647	KNOWN	1.686	1.087
25	19	20	16.0	1000.0	135.0	0.1332	KNOWN	0.147	0.095
45	19	51	20.0	1700.0	135.0	0.0764	KNOWN	3.736	2.410
41	20	51	20.0	1760.0	135.0	0.0791	KNOWN	3.658	2.360
95	21	22	16.0	750.0	50.0	0.6273	KNOWN	1.341	0.865
28	21	23	30.0	3300.0	135.0	0.0206	KNOWN	6.513	4.202
29	23	22	16.0	3050.0	135.0	0.4061	KNOWN	1.016	0.655
32	22	28	16.0	5600.0	135.0	0.7457	KNOWN	2.171	1.400
44	23	30	30.0	3200.0	135.0	0.0200	KNOWN	4.024	2.596
35	24	25	16.0	3050.0	135.0	0.4061	KNOWN	0.238	0.153
33	28	24	16.0	4800.0	75.0	1.8961	KNOWN	2.966	1.914
37	26	25	16.0	3050.0	135.0	0.4061	KNOWN	0.738	0.476
38	26	27	16.0	3300.0	135.0	0.4394	KNOWN	1.302	0.840
40	26	29	16.0	1600.0	70.0	0.7181	KNOWN	0.651	0.420
42	30	26	16.0	4800.0	70.0	2.1543	KNOWN	3.079	1.986
39	29	27	16.0	3840.0	70.0	1.7234	KNOWN	0.450	0.290
48	31	28	16.0	1600.0	75.0	0.6320	KNOWN	2.160	1.393
43	51	30	16.0	3200.0	135.0	0.4261	KNOWN	2.743	1.770
49	32	31	22.0	5120.0	75.0	0.4289	KNOWN	3.689	2.380
54	32	33	30.0	3300.0	135.0	0.0206	KNOWN	11.727	7.566
55	33	34	12.0	4800.0	135.0	2.5946	KNOWN	0.116	0.075
56	33	35	30.0	3400.0	135.0	0.0212	KNOWN	8.668	5.592
57	34	35	16.0	4800.0	135.0	0.6392	KNOWN	1.346	0.869
60	55	34	16.0	3680.0	50.0	3.0778	KNOWN	2.764	1.783
59	34	63	12.0	5600.0	50.0	19.0122	KNOWN	0.225	0.145
62	35	36	30.0	1800.0	135.0	0.0112	KNOWN	5.467	3.527
61	35	37	16.0	2400.0	70.0	1.0771	KNOWN	1.923	1.241
100	35	66	12.0	2700.0	60.0	6.5422	KNOWN	0.966	0.623
63	36	37	12.0	2000.0	50.0	6.7901	KNOWN	0.683	0.441
75	36	41	30.0	2400.0	135.0	0.0150	KNOWN	3.497	2.256
64	37	38	12.0	2700.0	50.0	9.1666	KNOWN	0.823	0.531
66	37	66	12.0	2700.0	50.0	9.1666	KNOWN	0.497	0.321
70	39	38	20.0	2080.0	135.0	0.0934	KNOWN	2.995	1.932
69	38	57	16.0	2000.0	50.0	1.6727	KNOWN	1.124	0.725
65	38	67	20.0	1760.0	135.0	0.0791	KNOWN	1.221	0.788
71	39	40	12.0	3680.0	50.0	12.4937	KNOWN	0.485	0.313
73	41	39	24.0	4000.0	40.0	0.7017	KNOWN	3.937	2.540
72	42	39	12.0	4800.0	50.0	16.2962	KNOWN	0.721	0.465
68	57	40	16.0	2000.0	60.0	1.1938	KNOWN	0.615	0.397
76	42	41	36.0	2400.0	135.0	0.0062	KNOWN	0.843	0.544
74	56	41	16.0	3000.0	135.0	0.3995	KNOWN	0.485	0.313
77	42	44	12.0	6500.0	50.0	22.0677	KNOWN	0.398	0.257
67	43	57	12.0	3400.0	135.0	1.8378	KNOWN	0.964	0.622
102	67	43	20.0	1600.0	135.0	0.0719	KNOWN	1.940	1.252
78	45	44	16.0	8000.0	100.0	1.8560	KNOWN	2.190	1.413
79	44	46	16.0	9600.0	70.0	4.3085	KNOWN	0.699	0.451
97	64	44	16.0	2400.0	50.0	2.0073	KNOWN	1.427	0.921
80	45	46	16.0	9600.0	110.0	1.8672	KNOWN	2.494	1.609
82	65	45	16.0	6240.0	80.0	2.1875	KNOWN	2.437	1.572
96	48	47	16.0	900.0	55.0	0.6310	KNOWN	1.056	0.681
47	50	47	12.0	2400.0	55.0	6.8309	KNOWN	0.621	0.401
83	47	65	12.0	5600.0	55.0	15.9388	KNOWN	0.390	0.252
85	48	49	24.0	2400.0	130.0	0.0476	KNOWN	6.837	4.411
88	50	48	24.0	2240.0	130.0	0.0444	KNOWN	8.087	5.218
86	49	53	16.0	11500.0	130.0	1.6421	KNOWN	0.914	0.590
84	49	65	24.0	3600.0	130.0	0.0714	KNOWN	5.736	3.701
31	59	50	24.0	3000.0	135.0	0.0555	KNOWN	3.916	2.526
99	50	63	12.0	8000.0	80.0	11.3845	KNOWN	1.378	0.889
91	52	59	24.0	2400.0	135.0	0.0444	KNOWN	8.384	5.409
87	65	54	20.0	16000.0	130.0	0.7707	KNOWN	2.031	1.310
36	55	64	16.0	3000.0	50.0	2.5091	KNOWN	3.219	2.077
81	59	58	12.0	800.0	135.0	0.4324	KNOWN	4.078	2.631
98	63	64	12.0	2400.0	50.0	8.1481	KNOWN	0.207	0.133
101	66	67	12.0	1400.0	60.0	3.3922	KNOWN	1.091	0.704

ERRATA SHEET (NOVEMBER 13, 1967)

Page No.	Location	Change From	Change To
Syllabus			
p.xi	par. 3, line 3	--Connect to Andrew Square and City Square	--Connect from Sullivan Square Charlestown to Boston Proper
p.26	TITLE	ESTIMATING	ESTIMATED
p.29	par. 16, line 3	Andrew Square	Sullivan Square
p.36	par. 3, line 6	Andrew Square	Sullivan Square
p.62	par. 11, line 4	Prices	Pipes
Appendix SLS4	-----	In Report after SLS5	In Report - p. 81 and p. 82